

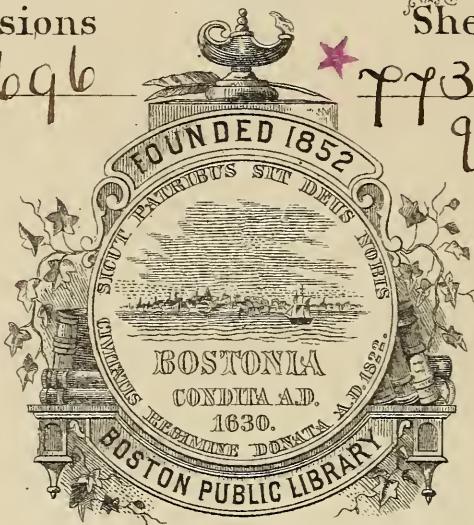
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PUBLICATIONS
OF THE
MASSACHUSETTS MEDICAL SOCIETY.

VOL. II.—N^o. I.

Spotted Fever or Cerebro-Spinal Meningitis

IN THE STATE OF MASSACHUSETTS.

REPORT

PRESENTED AT THE

ANNUAL MEETING OF THE SOCIETY,
MAY, 1866.

BOSTON :
PRINTED BY DAVID CLAPP & SON.

MEDICAL AND SURGICAL JOURNAL OFFICE.

1867.

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THE expense of printing the "Publications of the Massachusetts Medical Society" is defrayed by a Fund devised to the Society by the late Dr. GEORGE C. SHATTUCK.

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REPORT OF A COMMITTEE

OF THE

MASSACHUSETTS MEDICAL SOCIETY

ON

SPOTTED FEVER OR CEREBRO- SPINAL MENINGITIS

IN THE

STATE OF MASSACHUSETTS.

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PRELIMINARY REMARKS.

At the Annual Meeting of the Massachusetts Medical Society, held May 31st, 1865, it was Resolved, "That a Committee of one from each District Society be appointed by the President, whose duty it shall be to report at the next Annual Meeting of this Society, upon the prevalence of the disease called 'Cerebro-Spinal Meningitis, or Spotted Fever.'"

The Committee, as subsequently appointed, consisted of Dr. Luther Parks, of Suffolk County, Chairman: Dr. G. W. Doane, of Barnstable County: Dr. N. S. Babbitt, of Berkshire: Dr. Charles Howe, of North Bristol: Dr. F. H. Hooper, of South Bristol: Dr. E. P. Fearing, of Dukes and Nantucket: Dr. Wm. D. Lamb, of North Essex: Dr. H. O. Stone, of South Essex: Dr. J. W. D. Osgood, of Franklin: Dr. P. L. B. Stickney, of Hampden: Dr. A. W. Thompson, of Hampshire: Dr. Ephraim Cutter, of East Middlesex: Dr. N. B. Edwards, of North Middlesex: Dr. Alfred Hosmer, of South Middlesex: Dr. C. C. Tower, of Norfolk: Dr. H. N. Jones, of Plymouth: Dr. Joseph Sargent, of Worcester: Dr. T. R. Bou-telle, of North Worcester.

In the notifications sent to us of our appointment, it is stated that the "subject submitted to the Committee" is "Spotted Fever in Massachusetts." Therefore, though the resolution above quoted directs us, in general terms, to report on "the prevalence of the Disease called 'Cerebro-Spinal Meningitis' or 'Spotted Fever,'" it is the history of that malady as it has occurred in *this State* that we have especially investigated, and upon which we now offer our report.

REPORT.

THE SPOTTED FEVER OF 1806 TO 1815.

SOME half a century ago there prevailed in Massachusetts and other parts of New England, an epidemic called "Spotted" or "Petechial Fever;" and we must necessarily begin with some notice of that. By the direction of the Massachusetts Medical Society, a report upon that epidemic was in the year 1810 drawn up by a committee, on which were some of the most distinguished names in our profession. And though the question whether the Spotted Fever of 1810 was the same as the epidemic of to-day which is called by that name, has not been hitherto settled, yet notwithstanding the respectful distance of fifty-six years intervening between the report of 1810 and that of 1866, it is with sentiments of the utmost deference and diffidence that we find ourselves, in some sense, the successors of such names as JAMES JACKSON and JOHN C. WARREN.

In relation to that report, the writer of this has been favored with a letter from, and a personal interview with Dr. Jackson, by whom almost the whole of the former one was written. Our venerable father in medicine warns us to receive some of the statements quoted *cum grano salis*. He reminds us that the morbid anatomy of fifty years ago was not what morbid anatomy is now; that observers may have

sometimes erroneously thought they saw what they expected to see ; that on opening the brain, for instance, they may have pronounced that to be vascular congestion, which at the present time would not be considered a morbid appearance.

The materials for his report, Dr. Jackson says in his letter, "were furnished by a very few of the persons to whom queries were addressed, the same in kind as those in your first circular, but the replies were very few, and gave more opinions and theories than facts, so far as I recollect." . . . "In later years, I have met with a single case now and then, which I regard as the *old* spotted fever. I had one singular case, two or three years ago, in a school-master under the care of Dr. J. W. Warren." . . . "About 1853, a very singular case occurred in a woman, domestic in my own house. Her disease was a very brief one, and it was after her death that I came to a conclusion about it. I have not any notes of these cases."

The above statement of Dr. Jackson that he had seen sporadic cases of spotted fever, occasionally, since the epidemic of 1806 to 1815, we regard as a very interesting one.

It might be thought superfluous to offer, for re-publication here, anything which had already been printed in the Transactions of this Society. But we feel compelled to reproduce, among other citations, extracts from the report of the committee of 1810 (copies of which are rare), for the sake of comparing the old spotted fever with the recently prevailing disease which has received that name.

The "old" Spotted Fever first attracted attention by its appearance in the town of Medfield, Massachusetts, in 1806. Between the 8th and 31st of March, 1806, nine cases occurred in that town, all of them fatal. It then showed itself in other parts of the State and also of New England, subsequently extending itself to New York, Pennsylvania and Canada; also to Kentucky, North Western Virginia, and finally to the southern extremity of the United States. The

Committee's report, presented June 21st, 1810, traces its course in Massachusetts for the preceding Winter and Spring. After saying that the first part of the Winter, as also the Summer and Autumn of the year before, had been remarkably healthy throughout the country, it states that the disease appeared first in the town of Dana, about the beginning of the year, but not in any considerable number of instances until during the cold weather after the middle of January. It is then heard of at Petersham in the latter part of February, and at Barre, Oakham, Rutland, Paxton, Hardwick, New Braintree, Brookfield, Spencer, Sturbridge, Winchendon, Athol, Gerry, Leicester, and Worcester, in the course of the month of March, mostly about the third week in that month. The above mentioned towns are all in the county of Worcester. It occurred in Cambridgeport, Middlesex county, in the suburbs of Boston, on the 24th of March, and in April at Lancaster, county of Worcester. In the course of April and May a few cases occurred at Boston, and "perhaps an equal number in proportion," in the counties of Worcester and Middlesex. During May it appeared in Springfield, Hampshire county, and had not subsided in the second week of June.

Most of the country above indicated is, the Committee point out, inland and very elevated, having many fresh water ponds and streams. In Cambridgeport the disease was mostly confined to land which had been recently salt-meadow, and intersected by foul ditches. In Boston this disease, as also "typhus," had occurred mostly in those parts of the town near the flats and water.

On the whole, however, the epidemic was found to have occurred in seasons differing in their meteorological character, and in places very various in their soil and climate.*

* The authority for this statement is an unpublished manuscript of Prof. O. W. Holmes, which, together with valuable books, he most kindly lent me to aid in drawing up this report.

Drs. Bigelow and Holmes, in their edition of Marshall Hall, give the following summary of the symptoms of the disease; viz., sense of lassitude, great prostration, faintness at stomach, sinking of the pulse, coldness of surface, occasionally chills, pain in the head, coma, delirium or convulsions, vomiting, in some instances approaching that of cholera morbus, and the appearance of *petechiæ*, or spots of effused blood beneath the epidermis. To this should be added the not unfrequent occurrence of severe itching of the surface. Dr. North* mentions sore throat as a premonitory symptom to be found with but few exceptions when inquired for; so slight, however, that most patients do not mention it unless questioned. Redness of the throat and aphthæ were sometimes observed.

The eruption which gave the name of Spotted Fever to the disease was not constant, and was less frequent in the year 1808-9, than in the two years preceding. Dr. Henry Fish, giving an account of the disease in Hartford in 1809, says that in that place it was without spots, at least before death. The Committee of 1810 say it was not easy to determine in how large a proportion of subjects the skin was affected with spots and eruptions. One of their observers had seen only four instances of cutaneous affection in eighty cases, while another estimated it to have occurred in two thirds of all his cases. This last reporter, however, we are told, included very slight affections.

As to the character of the eruptions, the Committee say they were very various: such as red spots only, miliary eruptions, blotches, vesicles, sometimes resembling blood blisters, pustules, and rarely purpura, *petechiæ*, or vibices. Sometimes there was an appearance like measles. Dr. Strong says the spots did not rise above the surface, nor recede upon pressure. They appeared upon the face, neck, and extremities, and frequently over the whole body.

* North on Spotted Fever, 1811.

The invasion of the disease, say the Committee, is generally sudden and violent. In its course all the functions of the body are more or less interrupted, and often some of them are entirely suspended. The subject of it is seized in the midst of his usual labor or occupation, and oftentimes is struck down suddenly, almost as by a stroke of lightning. The first symptoms are various, such as local pain or paralysis, delirium, or coma, and rarely spasms or convulsions. Sometimes, though less often, says Dr. Hale,* the inception was slow and gradual, occupying several days. But, in whatever form the disease began, there ensued, and generally suddenly, great prostration of strength—a point much dwelt upon by writers.

The access often consists of shifting pains. The patients suddenly feel a pain in one joint or one limb, often in a finger or toe, in the side, stomach, back, or head. Sometimes the sensation is like the stinging of a bee, frequently it is most excruciating pain which at once arrests and commands the whole attention. This pain moves from place to place without losing its violence, generally approaching the head, and it is often confined to one side of the body.†

Observers concur in stating that every symptom was not to be found in every case. On the contrary, there was great variety in the symptoms, and great variety also in the order in which they occurred.

In the Committee's report, the only mention we find of

* Hale on Spotted Fever, 1819.

† In a work of Drs. Miner and Tully on Fevers (1823), is a notice of an epidemic which had prevailed for the eight years previous to 1822, in some parts of Virginia, and which the authors consider to have been a typhoid pneumonia. In that set of cases, there were some in which, instead of the chest, various other parts of the body would be affected with "a most excruciating pain." The attack occasionally began with pain in a *finger* or *toe*, or other parts of the extremities. In this connection, we will mention that Dr. James Jackson informs the writer that about the time, or shortly after the subsidence of the epidemic known as "Spotted Fever," which we are now describing, there prevailed in Vermont a pneumonia of a typhoid character, which had many characteristics in common with "Spotted Fever."

opisthotonus is in the following passage: "Spasms which frequently occur and shift suddenly as the pain does from part to part; sometimes resembling hysterical spasms, sometimes occasioning the head to be drawn back as in *opisthotonus*." But Dr. North mentions among "the more unusual symptoms" "a kind of clonic spasm of the muscles of the neck" (p. 15). He also says (p. 129) in the bad cases there were pain of the head and universal distress and agony, which would cause children to draw back their heads. Dr. North relates the case of Hannah Dresser, æt. 20, who in a relapse of the disorder had frequent spasms, sometimes of the limbs, sometimes of the neck, "drawing her head back like opisthotonus;" also that of Andrew Ellicott, æt. 6, who had strong spasms frequently recurring, by which his head was drawn backwards "like a person affected with *opisthotonus*." In this case the opisthotonus was subsequently replaced by a strabismus. Again, Dr. Samuel Woodward, of Torringford, Conn., in a paper quoted and commented upon by Dr. North in his book, mentions, among "the violent symptoms" observed in his own "experience," that the head was "drawn back with spasms." President Fitch also speaks of "pain and rigidity of the muscles of the neck often," and says the head is in many instances bent backwards.

Relapses occurred in many instances, but were rarely if ever followed by death.* And, according to Dr. North, the disease was not self-protective. He gives a case of a patient who had spotted fever in 1808, and again in 1810.

Fatal cases terminated in twelve, twenty-four, or forty-eight hours. In favorable cases reaction took place, and a mild fever of uncertain duration followed.†

The disease was of various degrees of severity: in a large proportion of cases very mild; in some severe, and, in a few, destroyed life "like the plague." The communica-

* Dr. Holmes's unpublished writings.

† Drs. Bigelow and Holmes in Marshall Hall's Practice of Medicine.

tions made to the Committee of 1810 related to the disease in its gravest forms.

With regard to the fatality of the malady, the Committee of 1810 say they were unable to make "any accurate statements," but that at the first appearance of the disease in the County of Worcester a very large proportion of those affected with it died at an early period of the affection. After it had extended more widely, its violence diminished, and the proportion of deaths became very small. The Committee say that women in different stages of pregnancy have been known to recover from severe attacks of spotted fever.

Statements differ as to the influence of age and sex, except that neither very young infants nor aged persons were so subject to the disorder as persons in middle life. Nothing further was ascertained upon the question of the causes, save that it prevailed mostly in cold weather, and that there was *no suspicion of its contagiousness*.

As to the treatment pursued in the old epidemic it may be worth noting that the extreme prostration led to active stimulation (which was carried by some practitioners to an absurd excess; to the extent of a quart of brandy, for instance, in eight hours); and that the free use of opium was commended by some, as it has since been by late Continental writers in what is called by certain of them "*epidemic cerebro-spinal meningitis*"—the malady which is now prevailing among us, under the name of "cerebro-spinal meningitis," or "spotted fever." There were of course, at the period when the disease of which we are writing prevailed, practitioners who, like Dr. Gallup, used blood-letting and other antiphlogistic remedies; but the general sentiment seems to have been that spotted fever was an asthenic affection, and should receive a supporting and stimulating treatment.

Autopsies in this epidemic were not numerous. Dr. Hale, in his large experience of it in Gardiner, Maine, did not

obtain one. The Committee of 1810, however, give reports of a few. The post-mortem appearances may be summed up as follows:

HEAD.

In some instances turgescence of the cerebral vessels was the only lesion found. This was generally in cases of short duration, i. e. in which death occurred in from twelve to twenty-four hours. In cases of longer continuance, there were found bloody points in the medullary substance of the brain, effusion of serum, the arachnoid and pia mater remarkably altered in appearance by the effusion of an opaque substance between them, "which may be called coagulated lymph, or semi-purulent lymph. This substance was frequently of the yellowish color of pus, with a consistence between the tenacity of lymph and the fluidity of pus." At other times it resembled well characterized lymph. There was sometimes adhesion of the hemispheres of the brain to the dura mater and to each other.

THORAX.

The Committee say that in every instance of which they were cognizant, the small vessels of the surface of the heart were beautifully injected. Lymph was sometimes found on the pericardium; and the endo-cardium was "occasionally altered from its healthy texture." Less frequently traces of inflammation were found on the pleuræ. In one case which is given below, the cavity of the thorax was the seat of very considerable disease, including apparently pulmonary congestion.

ABDOMEN.

The liver and spleen, says Dr. Holmes (*op. cit.*), are reported "to have been distended in various degrees, and free from any morbid change except an extremely livid color. The state of the stomach and intestines is so imperfectly

described that it is hardly possible to draw any conclusion respecting the morbid changes they may have undergone."

By way of illustration, we now give from the report of the Committee of 1810, descriptions of three autopsies which were performed by the late Dr. JOHN C. WARREN. With the first of these we copy the brief record of the symptoms. The second was the case referred to above, as showing marked traces of inflammation in the chest.

CASE I. The patient was a child of Mr. Gleason, aged eighteen months. The child, from being perfectly well and playful, was suddenly attacked with shivering fits, became stupid, and gave symptoms of severe pain in the head and back. Its skin when first noticed was livid and cold, but afterwards hotter than natural, though the heat did not continue long, and was succeeded by an unusual coldness. The tongue was coated with a light-colored mucus. The stomach was nauseated, and occasionally ejected such matters as had been lately swallowed. At the end of about twenty-four hours, the child exhibited some favorable symptoms. The pulse, which was before very much depressed and irregular, became distinct and less variable; the countenance was reanimated; the coma was succeeded by a return of sensibility sufficient to enable the child to recollect those around it. These flattering appearances lasted but a short time; the coldness and insensibility returned, the pulse became imperceptible, and the patient sunk in about thirty hours from the attack.

Dissection, nineteen hours after death.

EXTERNAL APPEARANCE.

The body exhibited on its anterior parts a considerable number of irregular purple spots, and a few regular ones. The back part of the trunk was of a very deep and uniform purple color.

HEAD.

The superior longitudinal sinus was full of dark-colored blood, which had partly coagulated. The external surface of the dura mater had nothing remarkable. When this membrane was divided, a quantity of serum was discharged, which was transparent on the left side, and bloody on the right. The child had been on the latter side from the moment of attack. The bloodvessels were not very full of blood; for a large quantity had been discharged from the longitudinal sinus. These vessels were generally covered by a substance, which accompanied them in the greater part of their course, bearing a resemblance to coagulated lymph in consistence, but approaching pus in color. Besides these portions there were many smaller masses situated in various places between the pia mater and tunica arachnoides, especially near the vertex and between the hemispheres of the brain. The thin coats were glued to the dura mater at the upper edge of the hemispheres, and the hemispheres were so strongly connected by these coats under the falk, as to require the aid of a knife for their division.

The superior parts of the cerebrum being removed, so as to expose the medullary substance, this was seen full of small red points, placed in clusters, which increased in size after a few minutes. The lateral ventricles were quite full, but not over distended with serous fluid. The plexus choroides was swelled but of a pale color, and its velum interpositum thickened by the same kind of lymphatic substance which has already been described. The third and fourth ventricles exhibited no peculiar appearance except the water which they necessarily contained. The superior part of the cerebellum and the inferior part of the cerebrum and cerebellum had a large quantity of the yellow colored lymph. The base of the cranium contained serous fluid. The consistence of this brain was healthy.

THORAX.

The lungs were of a light color on the fore part, and dark behind, as is usual in healthy lungs after death. Their consistence was natural. Their contents were a proper quantity of frothy mucus. The heart was very firmly contracted. The right cavities were full of black blood, and the left empty. The vessels on the surface of the organ were minutely injected with blood.

ABDOMEN.

The liver was large and turgid, and of a very livid color. On dividing it, great quantities of black blood were poured out. The gall bladder was moderately full of yellowish bile. The external and internal coats of the stomach had a perfectly healthy appearance. Its contents were a dark-colored fluid of vinous smell, similar to that of the substances taken before death. The coats of the small intestines were healthy. Their contents were yellowish in the first portion, and green near the cæcum. In the latter was a large dead lumbricus. The large intestines contained flatus without any offensive smell, and a considerable quantity of well-digested faeces. The spleen and pancreas had nothing remarkable. The kidneys were quite turgid, and discharged urine on being pressed. The bladder was full of urine.

The muscular fibres were livid, and of a natural strength. The blood was very dark colored, and coagulated after being discharged from the vessels.

CASE II. The next case was that of a man æt. 39, of a robust habit. The attack began with a chill three days after an exposure to rain, while he was much heated by working. Among the symptoms were cough, attended with a copious expectoration of "mucus of a common appearance," difficult respiration, and great "uneasiness about the breast."

AUTOPSY.

EXTERNAL APPEARANCE.

The body became covered with irregular purple marks of various size, about half an hour after death. The face was turgid, and this part and the shoulders were very livid. The blistered parts were quite dark colored and bloody.

HEAD.

The hemispheres of the brain adhered by their thin coats to the dura mater, and to each other. Between each of the meninges was some serous fluid, and an effusion of coagulated lymph. The last was most conspicuous over the blood-vessels, which were full of dark blood. The cortical substance was pale. The lateral ventricles were much larger than natural, from being distended by a transparent serum. The meninges at the basis contained coagulated lymph, and under them was a quantity of serum.

THORAX.

The fore part of the lungs was covered with a very thick layer of yellow coagulated lymph, which extended from the pleuræ of the lungs to the pleuræ of the ribs, fixed these two parts together, and then passed along the side of the cavity toward the spine. The right cavity contained a quantity of pus which was judged to amount to thirty-two ounces. The substance of the lungs was rather firm; yet they had not that kind of hardness which is produced by common inflammations of the lungs. The surface of these organs was shrivelled. Their color was peculiarly livid and unhealthy. The degree of firmness they possessed may be attributed to their containing more blood than is usually collected in those parts after death. The pericardium had a very little water. The heart was inflamed on the anterior face, and had a thick flake of coagulated lymph near the apex, and another on

the origin of the aorta. The cavities were equally filled with coagulated blood.

ABDOMEN.

When this cavity was opened there was not any very offensive odor emitted. The stomach was perfectly healthy in every respect, and did not contain any fluid. The intestines were in a healthy state. The liver was shrunk, and that part of its coat next the diaphragm bore marks of slight inflammation. The gall bladder was quite distended with dark tenacious bile. The rest of the abdominal viscera exhibited no remarkable appearance except the urinary bladder, which was distended with urine.

The blood and the muscles were of an exceedingly dark color.

In the above case inflammation of the meninges was complicated with inflammation of the serous membranes of the chest, together with probable congestion of the lungs.

CASE III. The subject of the *third* case was forty years of age—of good constitution.

EXTERNAL APPEARANCE.

The petechiae were less distinct than before death; the vesicles and efflorescence disappeared. The countenance and eyes not much altered.

HEAD.

The meninges of the brain contained a small quantity of serous fluid, and also a very considerable and uniform effusion of coagulated lymph. The hemispheres adhered to each other. The ventricles were full, but not over distended with water. In the basis of the cranium was a considerable quantity of yellowish fluid. Under the cerebellum and the

tuber annulare lay two large masses of lymph which compressed those parts, and indented themselves in their substance, especially flattening the last-named part.

THORAX.

The lungs had a healthy aspect. They were anteriorly light, and posteriorly dark colored. The heart was inflamed. The minute branches of the coronary arteries were rendered distinct by blood thrown into them. Near the apex and on the origin of the aorta were exudations of lymph. The valves of the organ were opaque; the cavities empty; but the aorta was full of black blood.

ABDOMEN.

The liver was of a good color and moderately distended with blood. The gall bladder was full of dark, tenacious bile. The stomach had two or three small spots of inflammation in the mucous coat; it contained some dark-colored fluid, and a little greenish mucus. The small intestines were in a healthy state, except a part, which was rather more red than the rest. The large intestines were contracted to a rope, except the rectum and part of the colon, which contained an alcoholic injection. The pancreas, spleen and kidneys had not anything worthy of note. The bladder was filled with urine.

The muscles had a livid color; so had the blood. This fluid coagulated after escaping from the vessels.

We insert here two cases which occurred in Brookfield, Worcester County, although they are dated in 1816, after the disease had ceased to be considered epidemic. These cases, hitherto unpublished, were furnished us through the kindness of Dr. John Homans, of Boston, in whose practice they took place while he was a resident of Brookfield.

CASE IV. On the fifteenth of April, 1816, M. S., a girl aged fourteen, large for that age, and in all respects enjoying good health, complained of headache, about 4 o'clock, P.M., which increased so she was compelled to take her bed at 7 o'clock.

She was restless and could not sleep, and notwithstanding the application of remedies, such as mustard plasters to the back of the neck, mustard baths to the feet, cold water to the forehead, &c. &c., she got no sleep. At 4, A.M., I saw her. The skin was cold and a profuse perspiration had commenced an hour previous; the eyelids were drooping. The surface of the whole person was covered with petechiæ, the spots being large as a quarter of an inch in diameter—on the face and neck varying in size to a mere point; and on the body and extremities much smaller than on the face. Color did not disappear on pressure. Pain in head and back of neck intense, mind confused, pulse 100, weak and irregular. At 6, lost power of speech, and died about 8, A.M. There was no convulsion, but slight opisthotonus. The above case occurred in the town of Brookfield; house situated on a slight elevation, a meadow lying on the southwest, and west of it. The family were in easy circumstances, and enjoying good health.

CASE V. On the fifth of May following, visited Miss C. A., aged 19, who had been in good health (though never robust) until the day previous, when she complained suddenly of headache, when at a short distance from home—so intense as to compel her to return. The pain I believe, in this case, was more severe in the back of the head, and upper part of the spine. In the after part of the day, she had nausea, faintness, pulse between 70 and 100, and feeble. Petechiæ commenced appearing in the evening, not so large or so numerous as in the other case, but, as in that, of a

deeper hue, and larger size on the face, than elsewhere; slight delirium followed, and her mind continued confused. Occasionally a slight convulsion occurred, and, as in the first case, slight opisthotonus, until death took place at the end of about 30 hours from the onset of the disease.

The locality in which the house stood was healthy, neither low nor much elevated, but sufficiently high not to allow water to remain stagnant. The father was a wealthy farmer.

No examination was allowed in either case.

What was the disease we have been describing? Dr. Holmes declares (*op. cit.*) "it is easier to say what it was *not* than what it was." He then goes on to say it was not scarlatina or angina maligna, as some supposed, else the character of the complaint would have been obvious in the mild cases, at least, of which there were great numbers. It was not pneumonia typhoïdes, he further remarks, because, according to the report of the Committee of the Massachusetts Medical Society, the structure of the lungs is not commonly deranged. Dr. Hale, speaking of the spotted fever of his day, *versus* typhoid fever then called typhus, says if "typhus" (typhoid) is to be considered a particular disease, the fever under consideration was not a "typhus," for it did not exhibit the characteristic symptoms which belong to that disease. It had not the regular approach, nor the uniformity of appearance of typhus. Its progress was more rapid, its features more variable, its changes more abrupt, and its termination more sudden. Dr. Holmes again (*op. cit.*) takes ground against the theory that spotted fever is a form of the British *Typhus*, in the following words: "A disease which was hardly suspected of being contagious, which was generally fatal in the first two days if at all, and was considered by experienced observers as free from danger if the patient survived the third day, in which the mortality varied from

one in two, or a still higher rate, to one in a hundred, and above all, which selected the villages of the interior for its ravages, and though it showed itself in the immediate neighborhood of the capital of New England, never attracted any notice, if it appeared at all, within its walls—such a disease presents too many points of difference when compared to British typhus to admit of being forced into the same category." Finally, while acknowledging the resemblance of the symptoms of the epidemic to those of the pernicious algid fever of malarious districts, he maintains that since "the disease did not present the intermittent or remittent character when its course was protracted, that the lesion of the spleen and the sequelæ of these diseases do not appear to have been present, that it prevailed at a season when they do not usually make their appearance," it is sufficiently proved that there is an essential difference between the spotted fever of 1806 to 1815, and the various forms of intermittents and remittents.

The Committee of 1810 came to the conclusion that their spotted fever was fever combined with internal inflammation, and that the inflammation was commonly erysipelatous; frequently of a character intermediate between erysipelatous and phlegmonous.

As erysipelas is an inflammation of an asthenic character, this definition is suggestive of the term used by Drs. Miner and Tully to designate the disease in question, viz.: Phrenitis Typhodes.

Dr. Tully, however, considered the spotted fever of his time to have appeared in some cases in the form of *typhoid pneumonia*. An epidemic of typhoid pneumonia, so much resembling the spotted fever as to be called by some a modification of that disease, prevailed in the Northern Division of the U. S. Army from 1812 to 1813, principally at Plattsburg, Burlington, Greenbush, and Buffalo. It was frequently fatal in twenty-

four hours, but more often the patient survived from four to six days.* Two other forms of the spotted fever were also recognized by Dr. Tully; so that he made in all four forms. viz.: *typhoid phrenitis*, *typhoid pneumonia*, *typhoid hepatitis*, and *typhoid enteritis*. Dr. Tully appears to have believed the typhoid inflammation in all these alleged phases of the spotted fever to be *the* disease, with no other lesion behind it in the chain of causation.

The epidemic we have been describing seems to have been lost sight of after the year 1815; and though Dr. Jackson has up to within two or three years met with a sporadic case now and then, spotted fever has till a short time since been known to most of the present generation of physicians only as a historical curiosity.

THE PRESENT EPIDEMIC.

HALF a century having elapsed since the report of the Committee of 1810, and during the height of the devastating war, which has just closed, the attention of the profession is called to an epidemic different from any disease the observers had met with before, and attacking various and distant parts of the country. As in the old spotted fever there were, in many instances, petechiae and other spots; like that epidemic, the disease was at first mistaken by some for scarlatina, an error which was soon laid aside; like that, it was thought to be assimilated to intermittents or remittents, while on

* Trans. Phys. Med. Society, New York, 1815 to 1817.

reflection it was readily seen that it occurred at a season of the year when miasmatic diseases do not prevail, and among persons who had not been exposed to malarial influences, or if exposed, less so than their companions who escaped the affection; and also, that it was not amenable to the treatment which usually controls periodic disorders; like the old spotted fever, it was considered by some as a form of the British typhus; by others denied such a classification; and for the same reasons that led the old spotted fever to be distinguished from typhus. By some, like the former epidemic, it was, and is, called "spotted fever," on account of certain cutaneous eruptions which show themselves in many cases. Others, seeing that these symptoms were not universal, and that cerebro-spinal symptoms were much more decidedly characteristic phenomena, while at the autopsies inflammatory or congestive appearances of the cerebro-spinal membranes were very generally found, gave it a name conformed to those symptoms and appearances, and corresponding somewhat to the pathology adopted by the Committee of 1810, as well as to that of Drs. Miner and Tully in selecting the term "phrenitis typhodes," viz.: cerebro-spinal meningitis, or epidemic cerebro-spinal meningitis.

SYMPTOMS AND POST-MORTEM APPEARANCES OF THE PRESENT EPIDEMIC AS COMPARED WITH THOSE OF THE EPIDEMIC OF 1806 TO 1815.

One of the ablest papers published on the present epidemic, that which at an early period brought it prominently before the profession, was by Dr. J. B. Upham on "Congestive Fever (so called), or Epidemic Cerebro-spinal Meningitis as it occurred in the winter and spring of 1862-63 in the Camps in and around the town of Newbern" [North Carolina].

We proceed at once to give Dr. Upham's summary of the

symptoms and morbid appearances, as presenting an admirable picture of the disease. Side by side with the former we give the corresponding symptoms of the spotted fever of 1806-15, subsequently mentioning the differences between the two, in order that some idea may be formed whether or not the epidemic of to-day is the same disease as the old spotted fever.

The passages from Dr. Upham's paper which are italicized have no corresponding ones from other authors.

Dr. Upham's Summary of the Symptoms of "Epidemic Cerebro-spinal Meningitis," in 1862-63.

- I. "In its mode of attack the disease was commonly sudden and without premonition, the patient for the most part continuing on duty and making no complaints till the very day of his seizure. Some of the most violent cases thus commenced. Case XIII. is in point, where the soldier appeared with his company at the evening dress parade, complained of chilliness, headache, &c., during the night, and was dead within thirty-six hours following.
- II. And the subjects of the disease in most cases were those previously in the fulness of robust health.

Corresponding Statements relating to the Spotted Fever of 1806-15.

- I. "The invasion of the disease is generally sudden and violent. * * * The subject of it is seized in the midst of his usual labor or occupation, and oftentimes is struck down suddenly almost as by a stroke of lightning."—Mass. Medical Society's Report, 1810, p. 122 of "Medical Pamphlets" in Public Library of Boston.
- II. "By some gentlemen it is remarked that females are more subject to the disease than males, and this was true in Worcester, the only town from which we have received a list of the sick. Yet one gentleman states that it attacks most especially the most healthy and robust, male and female."—

III. The symptoms were at the first headache, referred oftentimes to the back part of the head particularly.

IV. With dizziness—

V. Pain in the back and limbs, this last occasionally of an excruciating character.

VI. With sometimes rigors.

VII. Nausea and vomiting.

VIII. Chilliness rather than a well defined chill characterized the accession of the disease.

Mass. Med. Society's Report, 1810, p. 136.

III. The head is more frequently affected with pain than any other part; and when not affected at the first moment, it almost invariably becomes so in a short time.—Ibid. p. 122. Hale says "the head and back," p. 55. Williamson, quoted by North, says in some the pain was in the "back of the head, extending down the neck."

IV. Hale mentions dizziness frequently. "The most common mode of attack was by a violent pain in the head and dizziness."—P. 54.

V. "In the earlier part of the epidemic period, the disease always commenced with *severe pain* in some part of the body, which, if it did not begin there, soon extended to the head and back."—Hale, p. 55.—North, and M. M. Soc. Report say "excruciating" pain.

VI. "This prostration is accompanied or followed by universal or partial chills."—M. M. Soc. Report, p. 124.

VII. "Frequently eructations, nausea and vomiting ensue."—Ibid. p. 124.

VIII. Among the symptoms in "the most common mode of attack," Hale reports "chilliness," p. 54. Again, p. 57, "At a later period of the season * * * there was

IX. A peculiar stiffness in the muscles of the face and neck was often an early symptom.

X. This would be followed by local spasms,

XI. perversion of vision, &c.

XII. In some cases the initiatory symptoms were those of a severe cold, with a disposition to paralysis of the tongue and a portion of the muscles of the face.

XIII. With this the respiration would be difficult and irregular, giving occasion to fear a congestive attack of the lungs.

frequently rather a universal coldness and inaction than a real chill."

IX. "A kind of clonic spasm of the muscles of the neck" is mentioned by North among the "more unusual symptoms."—P. 15.

X. "Convulsions and spasms occasionally attend the access of the disease; but they are more frequent in its later stages."—M. M. Soc. Report, p. 123.

XI. "The powers of sight are affected in various degrees, from a slight dimness to absolute blindness."—M. M. Soc. Report, p. 123. "Blindness in some, in others double or treble vision."—North, p. 15.

XII. "In the muscles of *various parts*, paralysis has been occasionally observed; as in those of one hand or foot, and oftentimes in those subservient to deglutition." M. M. Soc. Report, p. 123. "In some of Dr. Hale's cases it is mentioned that the tongue was protruded with difficulty." The symptoms enumerated as those of "the most common mode of attack," on page 54 of Dr. Hale's book, will pass for those of the severe cold.

XIII. "The respiration was much and variously affected; in general it is difficult. Cough rarely occurs, and the difficulty of respiration has not commonly appeared

to arise from an inflammation of the lungs."—M. M. Soc. Report.

XIV. *There was often tenderness at the nape of the neck and along the spine early in the disease.*

XV. The skin was usually moist, but hot.

XVI. The face was suffused, often of a dusky hue, and the features distorted in the manner above mentioned—the eyes congested and suffused.

XVII. There was not for the most part active delirium, but perversion of intelligence rather, and dulness and indifference to outward objects, *from which condition the patient could be roused and made to answer questions consciously.*

XVIII. The tongue had at the first, a white creamy coat, which in the course of the disease, became yellowish or brown at centre and base,

XIV. *Pain in the neck and back are mentioned by authors, but tenderness distinguished from pain is not.*

XV. The old spotted fever was described as having three stages. In the first, Hale says, the skin was dry with a burning feeling.—P. 54. In the second stage it was warm, without that burning heat, and moist.—P. 68.

XVI. "The face and eyelids are often swollen; and in some cases the face is swollen and black like that of a person strangulated. The eyes" were "dull and glassy or red and watery." M. M. Soc. Report, p. 128. "Redness and effusion of the eyes," says North, p. 15. "Features dissolved, with a loss of all character and expression."—M. M. Soc. Report, p. 124.

XVII. "The delirium is often mild; in some cases, however, * * * it produces a fury which is scarcely to be restrained."—Ibid. p. 123. The Report does not say whether the patient could usually be roused so as to give logical answers.

XVIII. "The tongue is usually moist and white through the whole disease, when it terminates within three or five days. When it con-

more rarely dry and cracked towards the close.

XIX. There was loss of appetite,

XX. but usually not very urgent thirst.

XXI. The heart's action was irregular, sometimes tumultuous, to which the pulse did not always respond, being mostly accelerated but not strong, occasionally intermittent.

XXII. The bowels were regular, or inclined to diarrhoea and costiveness by turns.

tinues longer the tongue becomes darker colored, yellow or brown. It is sometimes clear and red."

—*Ibid.* p. 133.

XIX. "The appetite is diminished, but is not always so entirely destroyed as in most other acute diseases."

—*Ibid.* p. 133.

XX. "There is seldom any remarkable thirst."—*Ibid.* p. 133.

XXI. "Velocity of the blood increased, with a very sensible diminution of momentum in the radial, while in the carotid arteries it was much augmented." Danielson and Mann's *Essay* in Dr. North's book, p. 90. "The pulse like other symptoms was various, sometimes considerably full, but generally very weak, quick and irregular."—Dr. Woodward's remarks in the book of Dr. North, p. 113.

"They [the pulses] are sometimes hard: more often they are intermittent, and irregular both in force and frequency; they are remarkably variable, so that in the course of an hour, and indeed in much less time, they change from quick to slow, from strong to feeble, and vice versa.—M. M. Soc. Report, p. 130.

XXII. The bowels, some authorities say, were rather costive than loose. Dr. Hale says, "There were a

few instances of diarrhoea in the commencement of the disease, and it sometimes made its appearance "later. There was much more often a tendency to costiveness than to diarrhoea."—P. 93. But on the whole, he says, "the bowels showed very slight marks of disease." Page 92.

XXIII. Petechiæ were not an unfrequent manifestation—in appearance almost identical with the true typhus eruption, and like that seen upon every part of the body *except the face*—persistent upon pressure, varying in hue from the darkest aspect of measles to that of the true petechial spots imbedded in the skin. Purpural spots, abundant and of large sizes, were sometimes present, and were always a grave symptom.

[Other American observers have noticed besides petechiæ, efflorescences, ecchymoses, vibices. Also spots on the face.]

XXIV. There was no marked tenderness of the epigastrium or abdomen.

XXV. In the cases of longer duration there was in the last stages *sordes on the teeth and lips*,

XXVI. and involuntary evacuations of urine and faeces.

XXIII. The Committee of 1810 say the eruptions in their spotted fever were not constant, and varied from red spots to purpura, petechiæ, and vibices. An appearance like measles was sometimes noticed. They appeared on various parts of the body and limbs.—M. M. Soc. Report. pp. 135 and 136.

Dr. Strong says they were also found *upon the face*. He also says they did not rise above the surface or recede upon pressure. (Dr. O. W. Holmes, op. cit.)

XXIV. "The bowels showed but very slight marks of disease."—Hale, p. 92.

XXV. Sordes not mentioned. "When the disease continues longer, the tongue becomes darker colored, yellow or brown."—M. M. Soc. Report, p. 133.

XXVI. In the comatose stage, says Hale, "the urine and faeces were passed involuntarily."—P. 75.

XXVII. *The patients often die without much symptoms of exhaustion.* [In several of Dr. Upham's cases it is mentioned that the patients died without great exhaustion. Yet in cases V., VI., XI., use is made of the following expressions, viz.: "exhausted," "exhaustion almost amounting to collapse," "collapsed." The prostration in other reported cases is as excessive as in any of the epidemic of 1806-15. At any rate, all observers will concur in pronouncing the present epidemic one of decidedly adynamic character.]

XXVIII. *The decubitus was mainly on the side,*

XXIX. with the head not unfrequently thrown back, the neck rigid and stiff, a partial opisthotonus.

XXX. There was uniformly great restlessness and jactitation.

XXXI. As an accompaniment, and occasionally a

XXVII. "In whatever form the disease commences, there suddenly ensues great prostration of strength. In some instances the patient is described as almost immediately falling down under the weight of the disease."—M. M. Soc. Report.

XXVIII. No mention of decubitus found. In speaking of the pain, the Committee of 1810 say it is often confined to one side of the body, and the left side is more apt to be affected than the right.

XXIX. The Committee of 1810 speak of spasms "occasioning the head to be drawn back as in opisthotonus." P. 129. Other instances of occasional mention of this symptom have been cited above. But we should infer that it was much less frequently noticed in the old spotted fever.

XXX. "Restlessness and agitation."—M. M. Soc. Report, p. 124.

XXXI. Inflammation of the eyes I have found mention-

sequel to the disease, iritis was several times observed.

XXXII. So also was synovitis.

XXXIII. And in one instance pericarditis.

XXXIII. The above are among the more prominent and constant symptoms, but there was a considerable diversity in the manifestation of the disease during its progress, whether towards a favorable or fatal result; in no one case do I remember to have seen even a majority of those I have enumerated present.

XXXIV. The duration of the affection varied from a period of less than thirty-six hours, to that of three, four, or six weeks, and even longer."

ed, but without always discrimination as to the part of the organ affected.

XXXII. Analogous if not similar to this are the following statements. "In some cases swellings have occurred on the joints and limbs. These have been very sore to the touch, and their appearance has been compared to that of the gout."—M. M. Soc. Rep., p. 135. North says, "swelling like rheumatism of the joints."—P. 15.

XXXIII. "Occasionally inflammation is also found on the membrane covering the heart, and lining the pericardium."—P. 160, M. M. Soc. Report.

XXXIII. "Every symptom is not to be observed in every case; on the contrary there is great variety in the symptoms, and it is said there is great variety also in the order in which they occur." P. 127, M. M. Soc. Report.

XXXIV. "A few are taken off suddenly in ten or twelve hours; others in twenty-four, thirty-six, or forty-eight hours, from the first symptom of the disorder."

"By some of our correspondents it is said that recovery from this disease has been rapid and the subsequent state of the health as

good as usual. But the exceptions to these remarks are certainly numerous."—Pp. 126 and 135, M. M. Soc. Report.

Of the fatal cases (which were of relapse) in Hale's practice, three were prolonged to the thirteenth, sixteenth, and twenty-second days respectively. The cases of recovery he rarely attended longer than fourteen days. But the number of the sick and the distance between them, compelled him to leave them early in the convalescence.

An anomalous symptom described sometimes as marking the invasion of the old spotted fever, we are not cognizant of as occurring in our present epidemic, viz.: the access by a sudden pain in a joint, in a finger or toe, or a sensation like the stinging of a bee, &c., heretofore mentioned.* But the most important difference between the epidemic of 1806–15, and that of to-day, seems to be that opisthotonus does not appear to have attracted the attention of the older observers as a frequent and striking phenomenon. This difference will probably not be considered fatal to the identity of the two epidemics, since, at most, it shows only that the *spinal* did not share the affection of the cerebral meninges in the older one, and does not, it is fair to presume, prove a difference in its essential nature from that now prevailing.

Relapses occurred in 1806–15; and though Dr. Upham does not mention them, there have been many instances of them in the present epidemic.

* Stinging pains in the arms and legs have been lately reported, but not as the first symptoms.

We now quote Dr. Upham's summary of the *anatomical lesions*, which we think corresponds remarkably with that we have previously given, as compiled from the report of the Committee of 1810, even to the thoracic and abdominal complications.

"The *anatomical lesions* in the cases examined were confined principally to the brain and spinal cord. When death took place early, within two or three days, there was commonly opalescence of the upper surface of the cerebrum, seemingly in the subarachnoid fluid; an increased vascularitiy of the membranes of the brain and spinal cord, affecting the pia mater especially; a large increase of serum in the subarachnoid space and ventricles, clear or turbid, and mixed with flocculi of lymph, with, as often as otherwise, even in cases of the briefest duration, an abundant exudation of thick, yellowish, apparently semi-organized lymph on the base of the brain and medulla oblongata. Conjoined with these phenomena, there was, in such cases, more or less passive congestion of the lungs; increase of the pericardial fluid, and occasional engorgement and enlargement of the liver and spleen."

Correspondence between the foregoing and "Epidemic Cerebro-spinal Meningitis" as observed in France.

We cannot forbear to translate, here, from Valleix's *Guide du Medecin Praticien* (Vol. IV. pp. 540, 541), the greater part of his graphic description of the morbid appearances in what he denominates "*méningite cérébro-spinale épidémique*." We would premise that his statement of the symptoms corresponds so completely with those of our present epidemic of spotted fever or cerebro-spinal meningitis, as (taken together with the *post-mortem* appearances) to leave no doubt that we, in this country, are now at least dealing with a dis-

ease which has been observed in different parts of France for upwards of twenty-six years, and which has been most thoroughly described by Valleix under the name of epidemic cerebro-spinal meningitis.

"The anatomical lesions," says Valleix, "in this grave malady, have, as would be expected, been studied with the greatest care. The principal lesions have been found in the pia mater of the brain and spinal cord. Yet, all observers have reported a certain number of cases in which these lesions were very slight or inappreciable. Thus in some subjects there were found in the cerebro-spinal membranes nothing but injection more or less intense, a little limpid serosity, or, on the other hand, marked dryness without injection, but all these cases were from among those in which the meningitis had struck down the patient as by a thunderbolt, and in which by consequence the pathological alterations had not had time to develop. In other cases there were found in the meshes of the pia mater either a liquid which was yellowish (or yellow) and turbid; or thick perfectly well marked pus; or else a denser substance, of a pseudo-membranous appearance, opaque, yellowish, dense, of a thickness of 3 to 6 millimetres, and similar, according to an expression of M. Tourdes, to a layer of butter spread over the surface of the brain.* It is especially along the course of the vessels that this morbid production shows itself, and in fact, so long as it is in small quantity, it can only exist at these points and ramify with the veins. At other times there are seen here and there flat and otherwise uneven masses, of variable size, and composed of the same substance. Finally, this morbid product has been seen so abundant that it entirely enveloped the cerebrum and cerebellum. Ordinarily, neither do this layer nor the purulent

* See the summary above given of the morbid appearances in the epidemic of 1806-15.

masses show themselves except on the surface; but sometimes they penetrate with the pia mater even into the depths of the convolutions. Pus is not found in the cerebral ventricles save in a limited number of cases (half, according to the researches of M. Tourdes): sometimes these cavities contain only limpid serosity. Purulent infiltration of the choroid plexus, and superficial softening of the walls of the ventricles have also been seen, but these lesions are only of secondary importance.

"All points of the cerebellum and cerebrum are liable to these alterations: but they have been found almost constantly on the cerebellum, frequently at the summit and base of the cerebrum, more rarely on the pons Varolii, &c.

"In the spinal canal the lesions are similar and occupy likewise the pia mater. * * * * In the brain and spinal marrow injection and partial softenings are found. But, although a few symptoms observed in certain cases are referable to these lesions, the latter are only accidental in the disease under consideration, which is perfectly characterized by those we have just described.

"The alimentary canal has presented a few traces of slight inflammation in quite a number of cases; but never alterations of Peyer's patches, which have been found merely a little prominent. Brunner's glands are frequently enlarged through a great extent of intestine, but never ulcerated.

"The lesions found in the other organs need not delay us here, since they are rare and variable, and are considered only the result of complications. Suffice it to say, that there have been noticed inflammation of the *lungs*, of the *pleuræ*, of the *joints*, &c."

HISTORICAL NOTICE OF THE DISEASE.

WE have now compared the symptoms and anatomical lesions of the spotted fever of 1806-15 with those of the "spotted fever," otherwise called "cerebro-spinal meningitis" at present prevailing. We have also assumed to identify our epidemic with a disease which has been observed abroad, and there described under various names, among the most prominent of which is "epidemic cerebro-spinal meningitis." It is therefore in order in this place to say the few words remaining to be said of the history of the disease, before proceeding to the special work of collating its statistics for Massachusetts.

Discussions may be found in the works of various writers as to whether or not the disease under consideration be the same with certain epidemics described by the older nosologists. Into these discussions we do not propose to enter; we will merely mention that a French writer, M. Tourdes, has examined the question, and going back to the earliest period of medical history, has passed in review the different epidemics capable of being assimilated to cerebro-spinal meningitis. Valleix, in criticizing the narrative of M. Tourdes, remarks that it contains a number of facts which, without much forcing, might be considered as examples of epidemics of cerebro-spinal meningitis similar to those which have come under the eyes of observers in our day; but that it adduces other facts which cannot be so regarded, and can only be looked upon as epidemics of typhoid or typhus fever. He adds that in all these cases there is too great incompleteness of description, and deficiency of anatomical

investigation, to enable us to accord much importance to these historical researches.

The disease in question, denominated by the Italians, it is said, "*tifo apoplettico tetanico*," is sometimes described in Germany as "cerebral typhus." Among the Germans it is also popularly known as "*flecken fieber*," which means literally "spotted fever"; and again, on account of the painful contractions of the muscles of the neck, as "*genick-krampf*." Its usual scientific denomination in Germany is cerebro-spinal meningitis.

It is stated to have been first clearly recognized, at least in later times, at Geneva in 1805 (about the same epoch at which it broke out in New England); afterwards in different localities on the Continent, in 1806-7, 1811, 1813, 1814, 1815, 1816, and 1823.—(American Journ. Med. Sciences, July, 1864, p. 93.)

Valleix * states that "epidemic cerebro-spinal meningitis" invaded France some little time before the year 1839, showing itself first at Bayonne, Narbonne, Foix, Bordeaux. In 1839 it reigned at Rochefort, and almost exclusively in the prison for galley slaves, being taken there, at first, for typhus, but afterwards recognized as "epidemic cerebro-spinal meningitis." Later it raged in localities very diverse. A little while before the advent of the cholera in 1849, there were epidemics at Orleans, and Paris. In France the epidemics have shown themselves almost exclusively among soldiers (and those principally new recruits), which amounts to saying that its subjects were there mostly adults of the male sex, and from twenty to thirty years of age. At Rochefort, however, the affection attacked in the prison ("Bagne") principally middle aged prisoners, while in the town it raged mostly among individuals of less than twenty years of age,

* Guide du Medecin Praticien, Vol. IV., p. 529.

almost exclusively males. Valleix could not discover that either climate or season had any special influence upon the malady.

In Leipzig there were cases of the disease in July, 1864, followed by more in September and August. Prof. Wunderlich states that he had not heard of the malady in Germany before that time since 1849.

In Ireland, Dr. Darby, of Bray, first called the attention of the profession to the disease, having observed it in the Rathdown Union Workhouse, during the months of January, February and March, 1846. It appeared in the South Dublin Union Workhouse about the same time; and in the Belfast Workhouse in April and May of the same year, thus declaring itself in three different localities in Ireland, where it was described by Dr. Robert Mayne, in the Dublin Quarterly Journal of Medical Science for August, 1846, under the name of "cerebro-spinal arachnitis." Dr. Mayne says, "Its pathology seems to have been nearly uniformly the same, wherever examined. The serous membrane covering the brain and spinal marrow has been found *invariably* the seat of extensive inflammation; and unlike the more ordinary forms of arachnitis, the *spinal* arachnoid suffers much more severely than the *cerebral*." For the rest, the anatomical lesions corresponded with those given above from Valleix, Dr. Upham, and our Committee of 1810. The invasion of the disease was in most instances sudden. The Irish cases were generally fatal—some in 48 hours, most of them about the fourth day, while a few lasted a fortnight or three weeks. No mention is made in Dr. Mayne's report of petechiæ or other spots. The above cases were nearly all of *boys under twelve years of age*.

As we have said, the paper of Dr. Upham, published in 1863, in the Boston Medical and Surgical Journal, in the number for April 9th et seq., was one of the first to draw

the attention of the profession to the prevalence in this country of the present epidemic. But Dr. Gerhard, in an article presented to the College of Physicians of Philadelphia, April 1st, 1863, and printed in the American Journal of Medical Sciences for the following July, formally introduces the subject to the medical public with a notice of recent cases of which he had been cognizant, in and around Philadelphia, where, says Dr. Gerhard, the disease was at that time entirely novel. Since then many cases have been reported in that place. Dr. Gerhard states the subjects, of whom he was cognizant, to have been mostly from 15 to 25 years of age, and that more *females* were affected than males.

The evidence, however, of subsequent reporters, brings to light the occasional occurrence of the disease (since the epidemic of 1806–15) in diverse places in this country during a period of a score of years previous. For instance, Dr. Drake says it was first noticed in the “Interior Valley of North America” about the same time it attracted attention on the Continent of Europe, that is, in the year 1840–41.

In 1842 there was an epidemic of it in Rutherford County, Tennessee.

At a meeting of the College of Physicians of Philadelphia, April 6th, 1864, Dr. Gilbert stated that he saw at Gettysburg, “in 1844, or thereabouts,” two cases, in both of which there was sudden attack by chill, great prostration of the vital powers, with “cerebro-spinal complication,” stupor, coma, and death; the first case in twelve, the second in sixty hours. Another case was seen by Dr. Gilbert in Philadelphia, in 1846, in the person of an adult male who died in ten hours after the attack. Of the autopsy made in this case, Dr. Gilbert very briefly says, that the most remarkable condition discovered was a spotted appearance of all the serous surfaces of the chest and abdomen, no statement being made as to whether or not the head was opened.

In the autumn of 1845, and the following winter, it was at Mt. Vernon and other places in Southern Illinois.

From January to March, 1847, it was in Vicksburg, Mississippi.

In February, and the spring of 1847, it occupied Bentonville and Union City, Arkansas.

In January and February, 1847, a regiment of United States recruits from Mississippi, while in the vicinity of New Orleans, suffered severely from it.

In February, 1850, it prevailed in New Orleans.

In the winter and spring of 1848, the disease prevailed in Montgomery, Alabama, under the name of "epidemic meningitis."

At the last mentioned place the *post-mortem* appearances described were similar to those of the Committee of 1810, except that in the cases at Montgomery the spinal meninges were found to be affected. Dr. Ames reports that there were in Montgomery 250 cases out of a population of 4,000, or $6\frac{1}{4}$ per cent. Of 85 cases described, there were 22 whites and 63 blacks, the black population out-numbering the white. Of the whites attacked there were 10 males and 12 females; of the blacks, 36 males and 27 females. Dr. Ames gives the following table:—

Ages.	Whites.	Blacks.
Up to 6 years,	1	1
" 10 "	2	6
" 21 "	8	15
" 31 "	3	24
" 41 "	3	10
" 51 "	2	5
Above 50 "	3	2
	—	—
	22	63

At the South, says Drake (On the diseases of the Interior Valley of North America), the affection attacked town and

country, but not the larger cities, with the exception of New Orleans. The subjects were mostly children and young persons, but no age was exempt.

At a meeting of the Boston Society for Medical Improvement in 1849, Dr. Joseph Sargent, of Worcester, Mass., reported several cases of "cerebro-spinal meningitis," as he termed them, having the characteristic symptoms and anatomical appearances of the disease we are discussing. Those cases were instances of an *endemic*,* which prevailed in the towns of Millbury and Sutton (adjoining each other in the central part of Massachusetts), during the month of March, 1849. Perhaps Dr. Stillé refers in part to these cases when he says the disease appeared in Massachusetts and New York in 1850 to 1851.

According to Dr. Stillé the *present epidemic* took its rise in the central and western parts of New York (where it prevailed extensively), in the year 1857, and thence travelled southward at least as far as North Carolina. This statement needs to be modified, we find, in two points. The disease broke out in April of the same year, 1857, in the town of Becket, in Berkshire County, Massachusetts. Thus, it can hardly be said to have taken its origin in New York. Again, it has been heard from not only at the South, but in other directions—North, East, and West. If all the facts were known, perhaps Dr. Stillé's statement would have to be still further modified. For example, are we sure that the first cases have even yet been reported? From our experience in this State, showing the small number of cases which have been published in comparison with that which has come to light upon investigation, we infer that the information before the public of the epidemic at large, is very partial and imperfect. The following facts, however, illus-

* The word *endemic* is used here in the sense of a limited epidemic.

trative of its progress and behavior, we have culled for record here.

In the year 1858, cases were reported by Dr. Craig, to have occurred at Churchill, N. Y. In six of these cases, autopsies were made, at all of which were found inflammatory lesions of the meninges.

In the winter of 1861-62, there was an epidemic of the disease in Livingston County, Missouri, breaking out first among the soldiers in Chillicothe.

We find that in the fall and winter of 1863-64, it prevailed among the negroes in Memphis, Tennessee, mostly in subjects from 10 to 14 years of age, of both sexes; though many adults were attacked, and some very old negroes. The first winter, Dr. Morrill, the reporter, heard of no case of recovery. It occurred among the negroes in Maryland, in 1864.

It has extended its ravages, as we have said, in other directions. In the winter and spring of 1863, it raged extensively and very fatally in Northern Indiana. In Cambridge, Ohio, it prevailed to an alarming extent in 1863. Cases are also reported in Newark, Ohio, from Nov. 30, 1863, to January, 1864; and at Mechanicsburg, Ohio, in February and March, 1865.

At the anniversary meeting of the Illinois State Medical Society, in 1864, Dr. McVey read an account of its prevalence in Morgan County, Illinois, in 1863-64. On the same occasion, Dr. J. Adams Allen read an excellent paper on an epidemic of it prevailing, as he says, for some years previous, throughout Illinois, "and many of the North-western States."

In the months of January, February, March and April, 1863, there were seven cases among the midshipmen billeted on the school-ship in the harbor of Newport, Rhode Island. In the early months of the year 1864, it prevailed at Brat-

tleboro', Vermont, in the military camp; also in the village, and in isolated farm-houses for some miles around.

It will be our duty to report on its incursions in this State in another part of this paper.

It may be interesting to note that the Surgeon of the Flagship, "The Blackhawk," of the Mississippi Squadron, reports a case on his vessel in May, 1864, in a newly enlisted man, the only case in the Squadron. In this case the meningeal lesions were very marked on *post-mortem* examination.

Still more interesting, it seems to us, is the following fact. In the April number of the American Journal of Medical Sciences for 1865, Dr. Burns reports, among a number of cases of recovery in Philadelphia in the spring of 1864, two cases of what he claims to have been instances of the disease in question during pregnancy, thus repeating the experience of observers of the epidemic of 1806-15. Both patients were at the sixth month of gestation, and went their full time. One of the infants died of diarrhoea, in four months after its birth, the other in ten months, of "pulmonary catarrh."

Cases have been reported, in which sore throat was an early symptom; corresponding, like the cases just mentioned, with the observation of one of the reporters of the old spotted fever.

In relation to the prevalence of the disease in military camps and barracks, the writer addressed a letter to the Surgeon General of the United States, and received through Assistant Surgeon General Woodward a prompt and very kind reply, from which we give the following extract: "I am directed by the Surgeon General to say in reply to your communication of the 8th inst., that spotted fever, otherwise termed cerebro-spinal meningitis, has prevailed to a considerable extent among the troops in camps and barracks during the present war. Recruits have not escaped, and those have

especially suffered who were crowded in barracks and draft rendezvous." The records of the Surgeon General's office are not sufficiently made up to furnish a report of the comparative number of military establishments invaded by the disease, or of the proportion of recruits attacked by it. But these points will probably be published in official documents.

CONCLUSIONS FROM THE PRECEDING SKETCH.

To trace the course of the "spotted fever" in all its ramifications, even in this country alone, would be an arduous, if not an impossible undertaking, and is not our province. But, from the very brief sketch we have given, certain lessons may be derived, as follows, viz.:

I. The medical history of the Rebel States has been, during the war, to a great extent a sealed letter to us. But the writer remembers to have read, in 1864, a newspaper account of "a new disease" in one of the Gulf States, with a brief but very graphic summary of the symptoms, which tallies in most respects remarkably with those now familiar to us as symptoms of spotted fever, or cerebro-spinal meningitis. Of the large portion of the country, however, within our reach, North, East, and West, no extensive region seems to have been exempt.

II. From the fact mentioned by Dr. Jackson, that he had met with cases occasionally since the epidemic of 1806 to '15, and from the cases cited by Dr. Gilbert—two at Gettysburg, about 1844, and one at Philadelphia, in 1846—we perceive that there have been *sporadic* cases.

Endemics of the disease we have spoken of, as that of Dr. Joseph Sargent, in 1849, in this State; that of Dr. Ames, at Montgomery, Alabama, in 1848; and others.

Finally, we say the disease has prevailed as an *epidemic*, since 1857. Thus, the disease in question has prevailed sporadically, endemically, and epidemically.

III. Is this a *military disease*? In France, it has been declared so, since it there confined itself mostly to soldiers, among them particularly affecting new recruits. But, in Ireland, the reports given of it were from work-houses. In this country, military camps and barracks have often furnished the conditions requisite to invite its presence, since we are told by the Surgeon General it has prevailed in them "to a considerable extent." Its invasion of the regiment of United States recruits in Mississippi, in 1847, three years before it appeared in New Orleans, and ten years before it is supposed to have become epidemic, is an interesting fact. But while it is well known that many military establishments have escaped its incursions, private dwellings have, to a large extent, been visited with its baleful influence. Its course in the town of Brattleboro', Vermont, in 1864, may be taken as an epitome of its general behavior. It invaded the military camp for recruits on the outskirts of the town. There, the writer was told by Surgeon General Phelps, the chief medical officer in charge, that the opisthotonus was observed in a very intense form, the body of the patient being bent almost into the form of a semicircle. About the same time, it appeared in the village and in the distant farm-houses. A boarding school for boys, at the extremity of the village opposite to that where the camp was located, was represented by a single case.

Spotted fever, then, is clearly not exclusively, or *par excellence*, a *military* disease. To what proportionate extent military establishments, and particularly recruits are liable to it, remains to be ascertained.

IV. That the disease is *not* one of large cities, comparatively, is the general result thus far.

V. In France it is stated that neither *climate* nor *season* has been found to exert any influence upon the disease. In Leipzig, an epidemic described was in the summer. But in Ireland and this country, by far the greater number of cases hitherto reported have been in the first five months of the year.

VI. The evidence from all sources has been very generally in favor of the *non-contagiousness* of the disease. Facts strongly in point, are the single case in the boarding-school at Brattleboro', Vt., and the single case in the Mississippi Squadron.

VII. As to its choice of *sex*, the disease has shown great variation in different places. In the Irish work-houses it confined itself almost entirely to boys. In this country it has shown a preference in some places for the male sex, while in others more females than males have been attacked.

VIII. The *black* race in this country have not escaped the disease.

IX. In different sets of cases there is wide variation in the character of the *spots*, and the frequency of their occurrence.

X. The *fatality* of the disease has varied greatly in the different reports of the disease which have been given; e. g., the first winter of its visitation of Memphis, all the cases were fatal, while at Newport, 3 out of 7 recovered. We will remark here, that in the present epidemic, as in the old spotted fever, it has been noticed that those cases which proved fatal were generally so in a few days, or hours.

XI. The fact has been stated of the epidemic of 1806 to '15, that relapses sometimes occurred. They have also taken place in the present one. But, in the latter, unlike what obtained in the former epidemic, the instances of which we are cognizant have been often fatal.

XII. The present epidemic tallies with the old one in that cases of recovery from the disease *during pregnancy* have been related.

XIII. Finally, to sum up, the disease has shown great apparent capriciousness in its predilection for, or avoidance of military establishments; in its choice of sex; in the varying frequency of the occurrence of spots; in the character of the spots (we may add also by parenthesis, in the groups of its symptoms present in different individuals); in fatality; in liability to relapse.

It has been generally *consistent with itself* in the matter of contagion; and in prevalence in towns and the country rather than, or quite as much as, in large cities. It has shown, also, a frequent if not general preference for the earlier period of life.

Autopsies, in this disease, have not been numerous. Of those reported, almost all have given appearances within the cranium similar to some or other of those described above by Dr. Upham and others.

Exceptions, however, are alleged, upon which are founded by some the theory that the essential pathology of the disease is not in the meningeal inflammation. Thus Dr. Levick, in the July number of the American Journal of Medical Sciences for 1864, p. 136, gives the following instance.

CASE VI. [The] little patient, eighteen months old, was perfectly well on retiring to rest on the previous night. At one o'clock she awoke and complained bitterly of her head. At 9, A.M., she presented the following appearance: The skin uniformly and finely mottled, of a purple hue, with here and there a few isolated spots of a deeper purple. Eyes slightly ecchymosed, presenting a dull, stupid, and at times an astonished appearance; pulse 60. Carbonate of

ammonia given, and the hot bath and turpentine used externally. Child died at 3, P.M., same day. The autopsy was most carefully made at 4, P.M., next day, by Dr. Packard, in the presence of Dr. Fricke, Mr. J. C. Warren and myself, and presented the appearances enumerated below.

EXTERIOR.

Decomposition of the walls of the abdomen, which are of a green color. The surface of the body universally mottled; vibices on the knees, petechiæ on the legs.

HEAD.

On removing the calvaria, a large ecchymosis was found under the pericranium near the sagittal suture. The vessels of the dura mater were filled with dark fluid blood, which could readily be pushed aside by the handle of the scalpel. The substance of the brain and of the medulla oblongata was natural in its appearance and consistence. There was no effusion in the ventricles, and the most careful examination failed to detect the slightest evidence of inflammatory exudation.

ABDOMEN.

Blood fluid in the mesenteric veins. The intestines were everywhere dotted with minute extravasations of blood, both on their outer and inner surface. Similar ecchymoses were found on the bladder, in the kidneys, and on the diaphragm. *Spleen* healthy, the Malpighian bodies prominent. *Mesenteric* glands enlarged; the solitary glands largely developed; *Peyer's* glands unaffected.

THORAX.

Ecchymoses on the diaphragmatic pleura. The lungs contained large quantities of fluid blood. The left ventricle of the heart contained two soft coagula, about the size each of

a pea. In the right heart, the blood was thin and fluid, looking not unlike claret wine. There were no coagula in the right side.

CASE VII. Dr. Levick, also, in the American Journal of Medical Sciences for July, 1865, reported a case which died in twelve hours. The patient, a woman, was covered with spots. There was no pain in the head, no opisthotonus. At the autopsy, the meningeal vessels were filled with black blood. *There were no traces of inflammation in the brain or its membranes.* The liver was congested and fatty. There were blood stains on the pleuræ, stomach, intestines, pancreas, uterus. In the ovaries were several vesicles filled with black blood. A few spots were seen on the bladder, many on and in the kidneys.

It will be noticed that in the accounts of the autopsies in these cases, though it is said there were no traces of inflammation, yet it is not specified whether or not there were *opalescence*, or preternatural *dryness* of the meninges. We shall refer to this point again.

TREATMENT.

As to the various modes of treatment tried in this novel affection, there is very little satisfactory to be said. In the British practice, bleeding and mercury were resorted to. In France, also, as mentioned by Valleix, bleeding was among the remedies employed. Venesection has been tried there to a great extent, and with results less satisfactory to the criticism of M. Valleix than to some of those who have used

it. Cold applications to the head have rather disappointed the expectations which have been formed of them. Results have not been in favor of mercurials. Blisters have been much used, but no evident advantage was derived from them; on the contrary, they often augmented the suffering of the patient, without ameliorating any symptom. Sulphate of quinine was tried also, but given for the purpose of conquering the affection itself; it had no real success. Administered during convalescence, however, with a view of rousing the appetite and hastening the recovery of strength, it was found to be of considerable utility.

Some practitioners in this country have thought that benefit was derived from quinine in their hands; but Dr. Upham's observation of it at Newbern, was, like that of Valleix, unfavorable.

One remedy alone Valleix feels authorized specially to recommend, and that is one which practitioners have been timid in using in cerebral inflammation, viz., opium. He says opium in large doses is the only remedy which has been administered with any confidence, and which appeared to exert any real influence over the disease. The dose of this drug which has been employed with apparent success, is *two or three decigrammes and sometimes more*, in twenty-four hours; the decigramme being equal to 1.544 grains Troy weight.

Dr. Atlee tried opium at St. Vincent's Home in Philadelphia, an institution for young children, the patients varying from two to four years of age; the usual dose for them being one-twelfth of a grain of the extract. Of nine patients at the Home, four recovered and five died. One of them was a Sister of Charity in attendance. She recovered. The dose for her was one-fourth of a grain of the extract of opium every three hours. The results here were on too small a scale, of course, to be decisive.

In the epidemic of 1806-15, also, opium was used by some practitioners who claimed for it much success.

Inhalation of ether was tried in France, with apparent benefit, as a sedative.

Bleeding has been tried in this country, in the present epidemic, but not, we believe, with very encouraging results. Among other remedies, quinine, already mentioned, ergot, permanganate of potash and hydriodate of potassa, have been reported. There is a general tendency toward a supporting and moderately stimulating treatment.

SPOTTED FEVER, OR CEREBRO-SPINAL MENINGITIS IN MASSACHUSETTS SINCE 1815.

SPORADIC CASES.

THAT *sporadic* cases have occurred in Massachusetts has been already mentioned, Dr. Jackson having seen such occasionally since the epidemic which terminated in 1815. Perhaps, also, the two cases given in the account of the old spotted fever, which occurred in Brookfield, in 1816, should be classified under this heading.

THE ENDEMIC IN MILLBURY AND SUTTON, IN 1849.

We have already alluded to an *endemic* (as we call it) in this State, reported by Dr. Joseph Sargent, of Worcester. It attacked the towns of Millbury and Sutton, in Worcester County, in March, 1849. Millbury adjoins Worcester on the South-east, and Sutton forms the South-eastern border of Millbury. Of the first sixteen cases within a circuit of four

miles of a country not very thickly settled, there was no recovery that could be "relied on." Of twelve others subsequently reported to Dr. Sargent, by Dr. Rawson, only the first two died. Dr. Rawson, strange to say, depended mostly on bleeding and purging—not hesitating to bleed even in the cold stage. Death occurred in one instance of the first sixteen cases, in six hours from the attack: in three cases, within twenty-five hours; and in most cases, within four days.

In Millbury all were males but one, in Sutton there were three females at least; thus making four females or upwards out of the sixteen cases. In Millbury the disease was, for the most part, within a few rods of the Blackstone river. In Sutton, the cases were in various parts of the town, high and low. The Blackstone river skirts the town of Sutton on the North-east. In each of the two towns is a large pond or lake.

We here give, from the Records of the Boston Society for Medical Improvement, the following abstracts of those of Dr. Sargent's cases in which autopsies were made. We quote the reports of the autopsies in full.

CASE VIII. E. L., aged 55, scythe maker in Millbury. Went to his work well at 7, A.M., March 26th, 1849, and returned at 8, A.M., complaining of "aching in his bones." There was headache during day, becoming worse in afternoon. Passed the night in a comfortable quiet sleep. Awoke at 7 o'clock, on the 27th, with a very severe headache, soon becoming intense. Had a chill at 10 $\frac{1}{2}$, A.M. Pulse 85, apparently full, but easily compressed. Respiration not labored or hurried. Skin universally flushed, hot, dry; greatest heat about head. Pupils equal, moderately dilated, contracting to light. The patient seemed to be partially conscious. Being asked to put out his tongue,

would protrude it, and not retract it. Did not seem to be conscious of any pain—mistook morning for evening, and repeated the mistake when corrected. His tongue was dry, glossy, very red. At 1, P.M., a purgative having acted, the skin was universally pale, and cold, especially at extremities. Pupils contracted—obedient to light. The patient seemed entirely insensible to what was going on, talked incoherently, blowing the bellows, fishing, &c. Pulse 100, very small. At 5, P.M., was in great and almost constant jactitation—no rigidity. Died at 2, A.M., sixty-six hours after the probable invasion of the disease.

The treatment was by purgatives; calomel, with Dover's powder, and counter-irritation.

POST-MORTEM EXAMINATION THIRTY HOURS AFTER DEATH.

The body was mottled by large ecchymoses. Two to three inches of adipose substance over abdomen, and nearly as much over thorax. Viscera of thorax and abdomen, examined carefully, present no abnormal appearance. Lungs healthy and crepitating, valves of heart normal; spleen small, liver and kidneys of usual size and appearance. All the abdominal organs inlaid in adipose substance; no elevation of Peyer's patches.

Upon opening the *cranium*, there was no unusual adhesion of the dura mater, which presented its ordinary appearance, and preserved its polish on the arachnoid side. Under the *cerebral arachnoid*, over the upper surface of both hemispheres, was seen a whitish deposit, as of purulent matter. On attempting to remove the arachnoid, the pia mater came with it, the two adhering so closely as not to admit of separation; and the purulent deposit was between them. On both sides of the cerebellum there was a considerable intermeningeal deposit of pus, and lymph also. The membranes having been detached from the *cerebrum*, it had not its usual white-

ness and polish, but was dull and punctated, like the inside of a strawberry, and, on being scraped, was found to be somewhat softened. The cut surface presented an unusual number of red points. The *cerebellum* seemed healthy; no unusual fluid in ventricles. No pus seen along *medulla oblongata*.

The spinal marrow being exposed from the front, at commencement of dorsal vertebræ, a considerable deposit of pus and lymph was found without softening of the marrow.

CASE IX. A. G., æt. 47, farmer and teamster—usually a healthy man. Complained of “aching of the bones,” March 3d, 1849, which was much increased on the 4th. Slept well on the night of the 4th, but woke early on the 5th, complaining of severe headache, backache, “aching all over.” At 8 o’clock was found, by his medical attendant, lying on the side of the bed, his pupils much dilated, knowing nothing—with entire loss of muscular action, so that his hand if raised would drop. Pulse 80, and easily compressed. Head not very hot, general heat natural. Respiration not labored. He was lying like a man in a quiet sleep. Resisted in a dogged manner all medical and other interference. He was restless, getting up, walking about, and sitting down like a man with a stiff neck. Passed into a half conscious state, which he maintained, answering questions accurately for a moment, and then talking to himself or exclaiming with pain, till about the tenth day, when he sank into a typhoid state, with rigidity and opisthotonus. Then came subsultus tendinum, picking at the bed-clothes, and involuntary evacuations of urine. He died on the 13th day of his illness. The treatment was similar to that of the preceding case.

POST-MORTEM EXAMINATION.

The body was large, limbs rigid. On opening the head,

the veins of the meninges were found to be turgid, with dark blood. There was no unusual serous fluid below the arachnoid, but here and there, between the convolutions of the cerebrum, there was a whitish deposit, which, on the removal of the membranes, was found to be between the pia mater and the arachnoid, dipping down between the convolutions, and being of the consistence of lymph.

The membranes were easily detached from the cerebrum, leaving its surface white, polished, and of the ordinary firmness. It is rare to see the cerebral substance harder; the consistence was uniform; and the cut surface presented no unusual red points. The right lateral ventricle was distended with a serous fluid, containing flocculi of lymph and pus. The *choroid plexus* was red, like the comb of a cock. On removing the right hemisphere of the cerebrum from the skull, the anterior lobe presented an inter-meningeal deposit of pus and lymph, of an inch in irregular diameter immediately over the orbit. The sella turcica was covered in like manner, and the optic nerves enveloped—the nerves themselves preserving their ordinary consistence.

The right hemisphere having been removed, the deposit of pus and lymph dipping down between the convolutions on the other side, *in situ*, was quite remarkable. Neither tubercles, granulations nor ramolissement were found anywhere. At the base of the *cerebellum* and about the *medulla oblongata*, there was a good deal of lymph with abundant pus also; and this could be seen along down the *spinal marrow* as far as the eye could penetrate, all being bathed in pus. The *spinal marrow* was then exposed in front from upper dorsal vertebra to sacrum, and everywhere there was abundant pus between the pia mater and the arachnoid, especially on the posterior part, so that it could be spooned out. The spinal marrow itself and the nerves were quite firm. The right sciatic nerve, exposed by an incision through

the gluteal region, presented nothing abnormal. The lower lobe of the *right lung* was in a state of red hepatization—florid, solid, heavy, friable, containing no air. Lungs otherwise entirely healthy. Some subsidence posteriorly.

Spleen small; pancreas, kidneys and liver presented nothing unusual; intestines, examined throughout their whole track, presented nothing abnormal; no development of Peyer's patches; the bladder was distended with urine.

CASE X. The case was of a child in Sutton, aged five years, which died eight hours after invasion of the disease. There was nothing abnormal found in the examination, except a turgid state of the meningeal vessels, and a pulpy condition of the spinal marrow. The body was covered with purple petechiæ, a line or so in diameter, and not raised. The same were found on the peritoneal face of the stomach, and were confined to the peritoneum.

The patient in Case VI. lived the longest of all the fatal cases—thirteen days. The invasion in both V. and VI. was less sudden than frequently occurs. Case VII. seems to have been an instance of slight anatomical lesion attributable to the rapid termination.

Dr. Terry, now of Connecticut, but formerly of Sutton, Mass., gives us the following information in regard to his cases in that town in 1849.

Dr. Terry had six cases from the 26th of February to the 27th of March, 1849. Of these, four were males, and two were females. He says the whole region over which the disease extended, viz., Sutton, and the neighborhood, has a soil very retentive of moisture, and a damp atmosphere. The patients, with the exception of one fifty years of age, averaged ten years. The earliest age was five years. The section in which the disease prevailed, may be roughly estimated to be eight miles long and five wide. Scattered cases

of extreme severity occurred at about the same time in nearly all parts of that section. In a few instances several members of a family were attacked, but generally only one member. Dr. T. found no evidences of contagion. The average duration of the cases was fourteen days, the longest forty days, the shortest ten hours. Convulsions occurred in two cases of the six.

Headache was present and very severe in all the cases but one; in that one there was profound stupor from the onset. There was delirium in nearly all the cases, but not violent. The patients disliked to be moved or touched. When aroused to answer a question, the answer was usually short and petulant, sometimes logical, sometimes not. The head was drawn backwards in nearly all the cases. In one case the body was curved backwards nearly to a semi-circle. Petechiæ occurred before death in two at least of the six cases, and remained after death. Dr. Terry thinks they covered the bodies after death in most cases, but cannot positively so state.

Dr. Terry had but one post-mortem. That was in a case of a boy five years old, who died in ten hours after the attack. Dr. T. finds a memorandum, which says, "the large veins and sinuses of the brain were found much engorged with blood, the membranes (cerebral and spinal) injected, the spinal cord softened. Much turbid serum had been effused." Only the upper part of the spine was examined.

The treatment was by emetics and cathartics in the commencement, followed by diaphoretics, blistering the nucha, sinapisms to the legs and other parts. Warm baths in some instances. Only one of the cases was freely bled, and that was the only one that recovered.

Dr. H. E. McCollum claims to have had a few cases of the disease in Barnstable, in November, 1847. There were petechiæ, but no opisthotonus.

THE PRESENT EPIDEMIC,*

AS RELATED TO MASSACHUSETTS.

THE question of the present epidemic in this State is now before us.

We will begin this part of our report with two cases, which we give from the records of the Boston Society for Medical Improvement, as specimens.

CASE XI. April 11th, 1864. *Cerebro-Spinal Meningitis.*
Dr. Ellis reported the following case.

On April 4th, a young man came home from a store, in which he was employed, with a slight headache, but as he had been subject to this for several years, it attracted no particular attention. In the evening, however, it increased, and was followed by vomiting during the night. He continued about the same through the following day, and sat up long enough to have his bed made; but that evening he made strange answers, and sat up in bed. A homœopathist was called, but before his arrival the patient was attacked with spasms, which continued till towards morning, when the patient died suddenly, thirty-six hours after the commencement of the disease. The symptoms were attributed to poisoning, and no medicine was given.

At the examination made on April 6th, at 4, P.M., the arachnoid was found dry, and the convolutions somewhat flattened. There was no perceptible change in the cerebral substance, nor effusion into the lateral ventricle. The pia

* Our account is necessarily made up no later than January, 1866, most of the cases reported to us having been sent in before that time.

mater of the brain and spinal cord was opaque and infiltrated with thin pus. No apparent change in the tissue of the spinal cord. The bladder contained a large amount of urine. The spleen was somewhat enlarged.

Dr. Ellis remarks that "although the amount of pus was not so great as in some cases, the appearances were unequivocal." The short duration of the case may perhaps explain the limited development of the disease.

CASE XII. April 11th, 1864. Dr. Coale reported the following case.

E. B., aged fourteen weeks, a healthy infant, about January 27th, was observed to be restless and fretful, and to throw herself backwards frequently. Gradually her habitual position became one of flexion of the spine backwards, particularly in the region of the neck. She was brought to Boston and put under Dr. C.'s care, February 10th, just two weeks after the first signs of the attack. He found her lying on the side, the head bent backwards. The spine was also curved. The pulse was 100, regular. The bowels somewhat costive. There was no twitching of the limbs, no distortion of the face or squinting. The pupils were contracted. This state of things continued without alteration, except an increase in the intensity of the symptoms. Death took place February 19th, twenty-three days from the first appearance of the disease. At the time of death there was thorough opisthotonus, the trunk being bent backwards in the form of a semi-circle. There was no discoloration nor any spots on the skin. The treatment consisted in alteratives and revulsives to the spine, but without effect.

Though there was no autopsy in the last case, we consider it sufficiently characteristic to be of interest.

THE Committee now offer the results of certain special investigations made by them, as to the history of the present epidemic in this State.

SPOTTED FEVER, OR CEREBRO-SPINAL MENINGITIS
IN PUBLIC CIVIL ESTABLISHMENTS OF THE
STATE.

WE have made inquiries as to the occurrence of the disease in certain of the public civil establishments of the State, taking the entire list of "State Charities," so called, with the exception of the Hartford Asylum for deaf mutes, which is not in the Commonwealth; and also of the Eye and Ear Infirmary, which is omitted for obvious reasons. This list is as follows, viz.:

The Blind Asylum at South Boston; the Idiotic School at South Boston; the Westborough School; the Lancaster School; the Tewksbury Almshouse; the Monson Almshouse; the Bridgewater Almshouse; the McLean Asylum at Somerville; the Taunton Hospital for the Insane; the Northampton Insane Asylum; the Worcester Insane Hospital; the Lunatic Hospital at South Boston; the School Ship in Boston Harbor; the Hospital at Rainsford Island, Boston Harbor; the Deer Island Hospital, Boston Harbor; the Washingtonian Home, Boston; the County Receptacle at Ipswich; the House of Correction at South Boston; the State Prison at Charlestown; the Massachusetts General Hospital, Boston.

Together with this list should be taken into account the Boston City Hospital; and the Dale General Hospital, at Worcester, which latter, though an asylum for soldiers, is hygienically not of a military character.

In the Massachusetts General Hospital there have been

two cases. The patients having been carried there with the disease upon them, they are to be credited to the city of Boston, and do not count here.

In the Boston City Hospital there were, during the winter of 1864 to '65, *five cases, which originated in the Hospital.*

In the Monson Almshouse there have been *two* cases. In none of the other above-mentioned institutions have there been any cases.

THE DISEASE IN THE LATE MILITARY ESTABLISHMENTS WITHIN THE STATE.

WE have also obtained, through the kindness of Assistant Surgeon General Hooker, the following list of the Military Camps and Rendezvous of Massachusetts, viz.: Camp Wool, Brook Farm, and Camp at Fair Grounds, Worcester; Camp Cameron, North Cambridge; Camps Stanton and Schouler, Lynnfield; Camps Massasoit, Brigham, and Meigs, Readville; Camps Wilson, etc., at Lowell; Camp Stanton, at Boxford; Camp Joe Hooker, Lakeville; Camp Stevens, Grafton Junction; Camps Reed and Banks, Springfield; Camp Miller, Greenfield.

In none of these camps, all of which were remarkably free from sickness of every kind, was there any of the "spotted fever," or "cerebro-spinal meningitis."

But, in the same category belong the military establishments in Boston Harbor. Of these, Gallop's Island, Fort Warren, and Fort Independence, only have held any considerable bodies of men; and the two first—Gallop's Island and Fort Warren—alone have been visited by the dis-

ease. At Gallop's Island there have been 19 cases, and at Fort Warren 4 cases. The four cases at Fort Warren were recruits who went from Gallop's Island during the prevalence of the disease at the latter place, and are considered, by the medical officer reporting them, as to be credited to Gallop's Island.

At other places there have been only small garrisons or guards. Among these there has been none of the disease, as we are assured by a letter from Dr. Mc Laren, the Medical Director, which tells us that, with the above exceptions, it has not occurred in any of the forts, camps or rendezvous in his district.

SPOTTED FEVER OR CEREBRO-SPINAL MENINGITIS NOT PROVED TO BE A "MILITARY DISEASE" BY THE LATE EXPERIENCE OF MASSACHUSETTS.

WE find ourselves unable to set up a numerical comparison of the civil with the military establishments in the State, as to the relative amount of the disease among them, because while the former are permanent, the latter have existed for limited periods; because the numbers of troops at different points have of course fluctuated a good deal; and because of other varying circumstances in the history of the camps.

We are reduced to saying that the disease has occurred to a slight extent in a small proportion of the civil institutions above mentioned, i. e., in 2 out of 22; and also in a small proportion (2) of the whole number of military establishments in the State, however reckoned—considerably in one, to a slight extent in the other.

We may, however, remark that there have been one or more military camps, at different points, or successively at the same point, in ten towns in the State; and, also, considerable bodies of troops on three of the Islands in Boston Harbor, besides the inconsiderable garrisons or guards already mentioned. Where two or more camps are set down as in the same town, they have occupied the same spot either successively or together, except in Worcester, in which place the camp at Brooks Farm and that at the Fair Grounds were on widely separated sites.

Worcester, then, should be considered as furnishing *two* distinct military centres; the other 9 towns, *one* each. We may say, therefore, taking the eleven camps on the main-land, together with the three islands above mentioned, that the disease has occurred in 2 out of 14 principal military centres, so to speak, within the limits of the State.

Though the records of "spotted fever," or "cerebro-spinal meningitis," in this State, consist largely of cases from private practice, most of which we have not yet presented, we will here give our impression that while the experience of Massachusetts does not furnish grounds for any definite conclusions as to whether the disorder does, or does not, specially affect military camps or barracks, yet on the other hand it does not authorize us to consider it, as it is regarded by some in France, a military disease.

OVER-CROWDING ALLEGED TO BE A CAUSE OF THE DISEASE.

Dr. Page makes an interesting statement as to the behavior of the disease at Gallop's Island. He says the September case occurred at a period of great over-crowding. This over-crowding was abated, and nothing more was seen of the disease till January 29th, when the barracks were again over-crowded, there being from 130 to 180 men in a barrack intended for 100. Dr. Page presaged the renewal

of trouble, and reported the danger to the Government, begging that the over-crowding might be relieved, but in vain.

The cases went on appearing one after another, till the surplus number of men were shipped off, when it ceased. Dr. Page expresses a decided opinion that the disease at Gallop's Island arose from over-crowding.

Now, the question may be asked, whether the occurrence of the disease in military establishments be not owing, *generally or frequently*, to crowding too many men together in tents and barracks, rather than to any thing special in military life. If such should be found to be the case by any having a large number of military statistics within reach, such crowding can only be admitted to be *one* of the causes of the malady, since, as we have seen, it has preferred the country town, or village, to the large city, and has often visited the solitary farm-house. At the City Hospital, too, the patients were the reverse of crowded, and their wards were remarkably well ventilated.

NUMBER OF CASES IN THE TOWNS WHERE THERE WERE MILITARY CAMPS.

We subjoin, as perhaps not uninteresting, a statement of the number of cases reported in the towns in which were situated the military camps.

In Worcester, with 24,960 inhabitants (by last census), there were 6 cases; in North Cambridge, — inhabitants, no cases; in Lynnfield, with 866 inhabitants, 1 case; in Dedham (including Readville), with 6,330 inhabitants, no cases; in Lowell, with 36,827 inhabitants, no cases; in Boxford, with 1,020 inhabitants, 1 case; in Lakeville, with 1,160 inhabitants, no case; in Groton,* with 3,193 inhabitants, no cases; in Springfield, with 15,199 inhabitants, 11 cases; in Greenfield, with 3,198 inhabitants, 3 cases.

* In Dedham, Lowell, and Groton, the negative evidence is very decided.

At the U. S. military posts in Boston Harbor, where the disease appeared, the military were the only inhabitants.

It appears from this statement that the epidemic had rested somewhat upon some of the towns where were the military establishments, while in others of those places it had not shown itself. Yet, in none of such establishments, except those in Boston Harbor, with no civil surroundings, did the disease occur.

An examination of the tables shortly to be given, will show that in none of the places where the disease struck its strongest blows, were there military camps, rendezvous, or barracks.

PROPORTION OF RECRUITS AFFECTED.

Are *recruits* more liable, as has been stated in France, to "spotted fever," or "cerebro-spinal meningitis," than veterans? The affirmative is not sustained by the experience of Gallop's Island. At that place there were 19 cases reported, besides very slight ones not recorded; 13 of these 19 were recruits; 4 old soldiers; 2 not described. But, of the old soldiers on the Island, Dr. Page writes us, twenty-five hundred were recruits, and four hundred of permanent garrison. Therefore, while the recruits on the Island were to the permanent troops as about 6 to 1, the number of recruits who had the disease to that of the veterans sick with it, was only between 3 and 4 to 1; and that, even if we count as recruits the "two not described."

THE CASES OF THE PRESENT EPIDEMIC IN MASSACHUSETTS (AS COLLECTED UP TO JANUARY, 1866), ARRANGED IN TABULAR FORM.

WE have consulted the State Registration reports in the hope of finding in the registry of deaths, a statement of the numbers of persons who have died of "spotted fever," or "cerebro-spinal meningitis." But neither of these nosological terms appear among the "causes" of death. We have fared no better with the report of the Registrar of the City of Boston.

The information we have to present as to the experience of private practice has, with the exception of what we have derived from a few published cases, been obtained by correspondence with the Fellows of this Society. Circulars were printed, with the following heading, viz.:

"BOSTON, August 1, 1865.

"Dear Sir:—The Committee of the Massachusetts Medical Society on 'Spotted Fever,' respectfully ask you to fill out this blank with reference to any cases of 'Spotted Fever'—otherwise termed 'Cerebro-spinal Meningitis'—which may have occurred in your practice. If you have not had any cases, the Committee nevertheless earnestly ask you to write 'No' to the first question, and forward as directed.

"Please transmit to the undersigned, at No. 6 Chestnut Street, Boston, Mass. For the Committee,

"LUTHER PARKS, JR., M.D., Chairman."

The Circulars were mailed to each Fellow of the Massachusetts Medical Society. To address them we procured

the services of the book-keeper of the Boston Medical and Surgical Journal, who had the most perfect list extant of the members of the Society. He informs us that he sent out over nine hundred. It is to be regretted that the importance of returning negative replies was not universally appreciated, as we are left without reports from a large proportion of the towns in the State; though the thanks of the Society are due to the associate members of the Committee for their efforts to get the circulars returned.

The Chairman wrote to the other members of the Committee asking them to canvass their respective districts. He feels assured that they used every exertion to get the circulars sent in; and, from the tone of their correspondence, is led to the belief that no considerable number of recognized cases remain unreported.

The queries propounded in the circulars need not be stated here, as they can be inferred from the headings of the tables below. Other important questions we should have been glad to put, but acting by advice, we aimed at making the list of queries as short as possible, and felt that, as it was, it had extended to as great a length as the indulgence of our correspondents would bear.

The total number of cases directly reported, and which will be reckoned upon, in calculating the ratios of ages, symptoms, &c., is 287. But in apportioning these cases among their respective counties, two of them must be excluded, as having occurred in Whitingham, Vermont. These, however, are grouped together with others of Dr. Temple, in Heath and Rowe, Berkshire County, and cannot be isolated in taking account of the symptoms and other circumstances. Whitingham adjoins Heath and Rowe.

Likewise in the above-mentioned apportionment of cases among the *Counties*, there are 23 cases which occurred in Boston Harbor, which are to be left out; as also should 7

cases in Brookline, Norfolk County, occurring in 1866, while the reports for the other towns were closed before the present year.

For this reason, again, in reckoning the number of *towns* (relatively to their respective Counties), which sent affirmative replies, Brookline must be excluded. In the remaining calculations all the 287 cases will be counted in.

With this preface we give the tables we have prepared to embody the replies which have been received.

TABLES COMPRISING 287 CASES.

When there is not room in the tables for "Autopsies, Treatment, Remarks," these are appended, the cases to which they refer being indicated by Roman numbers corresponding with similar numbers in the tables.

Reading the tables horizontally we get a sketch of each case, or set of cases, so far as furnished by their reporters; reading vertically we obtain the aggregate results as bearing upon the several points investigated in the tables.

NAMES OF TOWNS.	Names of Reporters.	No. of Cases.	Their Dates.	Sources of the Disease.	Locality. High or low, damp or dry.	Districts thickly or sparsely settl'd	Condition of Patients.	Average Age.	Adult Age.	OF ADULTS.			Adolescence.	Childhood or Infancy.	Greatest Age.	Earliest Age.	Males.	Females.	Sporadic or Epidemic.	Cases show- ing evidence of Contagion.	Average Duration.	Shortest Duration.	Greatest Duration.	Convulsions. No. of cases in which they occurred.	Head No. of which i		
										Adv.	Mid. Age.	Age.															
Boston, <i>Suffolk Co.</i>	A. A. Gould, M.D.	1	Apr. 6, 1864.		Low and damp, just above and near tide water—U. S. Hotel.	Medium.	Easy circumstances.	26 yrs.	1		1			26 yrs.	26 yrs.			1		Sporadic.	0	4 ds.	4 ds.	4 ds.	1	1 inter- cont.	
Boston, <i>Suffolk Co.</i>	S. Cabot, M.D.	2	April, 1864.		Low. 1 Albany St., near U. S. Hotel. 1 in Williams St.	Not crowded.	Easy.	2 yrs.						2	2 yrs.	2 yrs.					0	about 4 w.	about 4 w.	about 4 w.	0	Not known patients to manifest was sl	
Boston, <i>Suffolk Co.</i>	G. Hayward, M.D.	1	Mar. 26, 1864.				Easy.	6 yrs.						1	6 yrs.	6 yrs.	1					0	30 h.	30 h.	30 h.	1 also jactitation.	
Boston, <i>Suffolk Co.</i>	Calvin Ellis, M.D.	1	Apr. 4, 1864.				Easy.	17 yrs.						1	17 yrs.	17 yrs.	1					0	36 h.	36 h.	36 h.	1	
Boston, <i>Suffolk Co.</i>	W. E. Coale, M.D.	1	Jan. 27, 1864.				Easy.	14 w.						1	14 w.	14 w.	1					0	23 ds.	23 ds.	23 ds.	0	Not kn
Boston, <i>Suffolk Co.</i>	Calvin G. Page, M.D.	1	Sept. 26, 1865.	Preeeded by symptoms of cold, attributable to exposure.			Easy.		1									1				0	14 ds.	14 ds.	14 ds.	0	
South Boston, <i>Suffolk Co.</i>	J. F. Gould, M.D.	3	June 30, 1864. July 3, " " " July 17, "	Not known.	High. Soil hard and dry.	All in one house. District not very thickly settled.	Poor.	22 yrs.	1	1	1	42 yrs.	7 yrs.		3					Sporadic.	0	9 ds.	4 ds.	3 w.	1	2 sec- 1 sil	
Boston, <i>Suffolk Co.</i> [Sent to Mass. Gen. Hos.]	Under care of J. B. S. Jackson, M.D.	1	Feb. 25, 1864.	Not rerecorded.	Not rerecorded.	Not recorded.	Easy.	26 yrs.	1	1	26 yrs.	26 yrs.	1						Not recorded	31 ds.	31 ds.	31 ds.	31 ds.	1	1 sev- cons		
Boston, <i>Suffolk Co.</i> [Sent to Mass. Gen. Hos.]	Under care of A. A. Gould, M.D.	1	Feb. 27, 1864.	Not recorded.	Vine Street—low.	Thickly.	Easy.	17 yrs.		1	17 yrs.	17 yrs.	1						ditto.	23 ds.	23 ds.	23 ds.	23 ds.	1	Pain se- front par- extending and be- shou		
Boston City Hospital, <i>Suffolk Co.</i>	J. N. Borland, M.D.	5	Nov. 5, 1864, to Dec. 3, 1864.			Sparsely.			5	5				5					ditto.	2 fatal in few hs. ea. 1 rec. 4½ m. 1, 5m. 1, 8w.	"a few hs."	about 5 m.	In all three of the cases fully described.		Of the 3 ly des- 2 sev- 1 slig		
Gallop's Island Bar- racks, Boston Harbor.	Calvin G. Page, M.D. V. Surgeon U. S. Army.	19	1 Sept. 14, 1864. 18 Jan. 25, 1865, to April 11, 1865.	Overcrowding in barracks. Possible contagion in 2.	High and dry.	Over-crowded.	Soldiers.	21 yrs.	6	6	13	40 yrs.	15 yrs.	Soldiers.	Sept. 14, 1864.	Apr. 11, 1865.	Epidemic.	2 ?	about 4½ ds. fatal. 56 ds. recov.	Acute symp. 30 min.	about 4 m. recov.	0. But uneasiness or jactitation in a majority.		In all the developed			
Fort Warren, Boston Harbor.	Joel Seavers, M.D. A. A. Surgeon U. S. A.	4	Feb. 26, Mar. 17, Mar. 18, Mar. 23, 1865.	The barracks on Gallop's Island. Patients all reenruts from thenece.	Low point running into the sea, but not wet by the tide.	Over-crowded while at Gallop's Island. At Fort Warren, as usual in military quarters.	Soldiers.	31 yrs.	3	3	1	45 yrs.	17 yrs.	Soldiers.	Feb. 26, 1865.	Mar. 23, 1865.	Epidemic.	4	11 ds.	12 h.	37 ds	No general convul- sions, but much convulsive action in all.		In all. excre			

Headache. No. of cases in which it occurred.	Delirium. Character of.	Opisthotonus severe.	Opisthotonus slight.	Tenderness at Nucha.	Pulmonary and Pleural Symptoms.	Cardiae.	Abdominal.	Morbid Appearances of the Skin.	TERMINAT'N.		Autopsies.	Treatment.	Remarks.	
									Recover'd.	Fatal.				
1 intense and continuous.	Became unconscious on 2d day, and never spoke after.	No proper opisthotonus, but tension and rigidity of neck.		Not ascer- tainable.	Bronchial cough a day or two previous to visit.	Nothing peculiar remembered.		Small, purplish, permanent petechiae everywhere. Swell- ing and redness of knuckles.		1	0	XXXVII.	XXXVII.	
Not known. Pa- tients too young to manifest. There was shrieking.	Too young to manifest.	2		2		Pulse not particularly quick.		0		2	0	Hydriod. potassa.	There was convalescence, followed by relapse in both.	
1.	Loss of consciousness.		1		Respiration hurried and labored. Con- gestion.	Pulse 120—varied in force.	Nausea.	Small, round, purplish dots, in- creasing in size & numbers, clear and distinct, not raised. On right arm an irreg. shaped blotch like purpura, 1 in. by 1 1/3. Others on body and limbs.		1	0	1 emetic—stimulants, hot applications, sinapisms, nourishment.		
1	1						Vomiting.			1	Reported above, p. 56.	Nil. Not under care of Dr. Ellis.		
Not known.	Not known.	1 severe; patient bent to semi- circle.				Pulse 100—regular.	Slight cos- tiveness.	0		1	0	Alteratives, revulsives to spine.		
1	Slight delirium.		1		Coarse rales at base of chest; difficult expectoration.	Pulse variable.	Bowels cos- titive, urine scanty.	Petechiae abundant on forehead, chest and back.		1	0	Stimulants, quinine, hy- driod. potassa, counter-irritation.	Paralysis of limbs, particularly on the right side; could not feed himself nor turn in bed. Some paralysis of muscles of speech and deglutition.	
2 severe. 1 slight.	2 cases. Logical answers in 1.	0	2	2 severe. 1 slight.		3, pulse accelerated.		Petechiae in 2. In 1 on neck and chest, size of quarter dollar. In the other like flea-bites on body—transient in both.		2	1	0	XXXVIII.	XXXVIII.
1 severe and constant.	Active at first, then mere wandering, from which he could be roused.		?	0	Slight cough, with pain at base of the right lung. No physical signs.	Pulse 100 to 120—full and regular.	Tenderness, costiveness, Ischuria vesicalis.	None recorded.		1		0	XXXIX.	XXXIX.
Pain severe in front part of head, extending to neck and between shoulders.	1. Logical answers.	1		Not recorded	Respiration labored.	Pulse varied in force, and from 88 to 120.	Vomiting. Slight tenderness, retention of urine.	Skin hot and dry; no spots recorded.		1	XL.	Leeching, cathartics, mercury, opiates, and diffusible stimulants.	Attack came on with chills and vomiting. There was deaf- ness and multiplied vision.	
Of the 3 cases ful- ly described, 2 severe, 1 slight.	Of 3 cases fully describ- ed, 2 were delirious and and both of them gave logical answers.	Of 3 cases fully describ. 2 had severe opisthotonus.	0	Of 3 cases fully describ. 2 had tender- ness of, and 1 pain at nucha.	Of 3 cases fully de- scribed, 2 had labor- ed or hurried respiration.	Of 3 cases fully described, in 1 the pulse was 96, in 2 it varied.		Of 3 cases fully describ., constipation in all 3, vomiting in 1	0	3	2	0	XLI.	XLI.
In all the fully developed cases.	In all the fully developed cases but one; in that one, coma. Logical answers generally.	Same in one case, not se- vere. In 1, emprostho- tonos. See "Remarks."	In about two thirds of the cases.	Probably in all.	Respiration abnor- mal in about half the cases.	Pulse generally abnormal.	Nausea or vomiting frequently an early symptom.	Petechiae very general, though variable in size and sometimes slight. In 1 surface nearly black. In another they sloughed, and were followed by formation of crusts in thin layers, desquamating furfuraceously from the top.		3	16	0 Not allowed.	Tonic and freely stimu- lant.	XLII.
In all. In some exacerbiating.	In all. Logical answers in all cases at some times; at other times there was very violent delirium, or occasionally of a low muttering character.		In all 4.	In all 4.	None, except in 1 case. Decided hepatic- ization in one lung in that.	Pulse small, frequent, 100 to 140.	Meteorism in all 4; Diarrhoea with invol- untary dis- charges in 1.	Petechiae in all 4; in size from a point to qr. in. in diam., of a red, violet or black color, not perceptibly raised—coming on at first invasion and fading out in few days if patient lived so long. Occasionally returned in less deg.		4	0 Not allowed.	Quinine and brandy freely, opium and valerian.	XLIII.	

Names of Towns.	Names of Reporters.	No. of Cases.	Their Dates.	Sources of the Disease.	Locality. High or low, damp or dry.	Districts thickly or sparsely settl'd	Condition of Patients.	Average Age.	Of Adults.			Adolescence.	Childhood or Infancy.	Greatest Age.	Earliest Age.	Males.	Females.	First case in Town, so far as known by Reporter.	Last case in Town, so far as known by Reporter.	Sporadic or Epidemic.	Cases show- ing evidence of Contagion.	Average Duration.	Shortest Duration.	Greatest Duration.	Convulsions. No. of cases in which they occurred.	
									Adv.	Mid. Age.	Age.															
Boston, <i>Suffolk Co.</i>	C. E. Ware, M.D.	7	1864-65.	Not known, except that one came from the school at Pitts- field, where so many cases occurred.	None were in the highest parts of the city.	Not crowded.	Easy circumstances.	about half the cases.				about half the cases.	60 yrs.	11 yrs.	3	4			?	0	Fatal 13 d. Recov say 4 w.	10 ds.	5 w.	0	P i n	
Boston, <i>Suffolk Co.</i>	C. E. Buckingham, M.D.	4	Mar. 29, 1864. Apr. 23, " May 6, " Sept. 29, 1865.	In one supposed from malarial exposure—an officer in the artillery.	Tremont, Worcester, Parker and Pleasant Streets—all on a low level.	Not crowded.	Easy.	21 yrs.	2	2	1	1	35 yrs.	5 yrs.	3	1	Mch. 29, 1864.	Sept. 29, 1865.	Sporadic.	0	See "Remarks."	I fatal less than 24 h.	1 recd. many mos.	In one only, a child.	I n c	
Boston, <i>Suffolk Co.</i>	H. J. Bigelow, M.D.	1	May 2, 1865.	Not known.	High and dry.	Not crowded.	Easy.	23 yrs.	1		1		23 yrs.	23 yrs.		1				0	5 ds.	5 ds.	5 ds.	1		
Boston, <i>Suffolk Co.</i> Roxbury, <i>Norfolk Co.</i>	L. R. Sheldon, M.D.	2	1 Apr. 7, 1865. 1 July 20, " 2 Aug. 1, "	Over-fatigue and want of cleanliness and nonrishment.	Low and damp.	Thickly.	Poor.	12 yrs.				4	17 ms.	2	2			Aug. '65	Sporadic.	0		2 ds.		4		
Boston, <i>Suffolk Co.</i>	A. D. Sinclair, M.D.	3	Apr. 30, 1864. May 1, " Jan. 24, 1865.	Not known.	No preference.	Thickly.	Easy.	19 yrs.	1		1	2	46 yrs.	4 yrs.	3		Apr. '64. Jan. '65.	Sporadic.	0	24 ds.	10 ds.	7 w.	In two cascs; 1 severe, 1 slight.			
Boston, <i>Suffolk Co.</i>	Th. H. Hoskins, M.D.	1	Oct. 2, 1862.	Not known.	Northfield Street ; low, not damp.	Not crowded.	Easy.	23 yrs.	1		1		23 yrs.	23 yrs.		1				0	4 ds.	4 ds.	4 ds.	0		
Boston, <i>Suffolk Co.</i>	W. O. Johnson, M.D.	1	April, 1864.	Not known.	Made land, near Charles River.	Thickly.	Poor.	40 yrs.	1		1		40 yrs.	40 yrs.	1		Apr. '64. Apr. '64.	Sporadic.	0	4 w.	4 w.	4 w.	1			
Boston, <i>Suffolk Co.</i>	J. S. Jones, M.D.	3	1865.	No record.							3					3										
Boston, <i>Suffolk Co.</i>	Anonymous.	1	Feb. 20, 1864.	Severe cold weather.	High and dry.	Crowded neighborhood.	Poor.	9 yrs.				1	9 yrs.	9 yrs.		1				0	43 h.	43 h.	43 h.	0		
Boston, <i>Suffolk Co.</i>	Anonymous.	1	Dec. 1864.	Not known.	Dry.		Easy.	3 yrs.				1	3 yrs.	3 yrs.	1		Dec. '64. Dec. '64.	Sporadic.	0	4 ds.	4 ds.	4 ds.	1			
Boston, <i>Suffolk Co.</i>	B. S. Shaw, M.D.	1	July or Aug. 1863.	Traumatic.	High and dry.	Not crowded.		8 yrs.				1	8 yrs.	8 yrs.	1					0	10 ds.	10 ds.	10 ds.	1		
Boston, <i>Suffolk Co.</i>	William Read, M.D.	1	May 18, 1864.				Easy.	26 yrs.	1		1		26 yrs.	26 yrs.		1				0	about 2½ m.	about 2½ m.	about 2½ m.	No clonic spasms, hands clenched, arms strongly flexed, feet inverted		

[E]

Average Duration.	Shortest Duration.	Greatest Duration.	No. of cases in which they occurred.	Headache. No. of cases in which it occurred.	Delirium. Character of.	Opisthotonus severe.	Opisthotonus slight.	Tenderness at Nucha.	Pulmonary and Pleural Symptoms.	Cardiac.	Abdominal.	Morbid Appearances of the Skin.	TERMINAT'N.	Recov'd.	Fatal.	Autopsies.	Treatment.	Remarks.	
Fatal 13 d. Recov say 4 w.	10 ds.	5 w.	0	Present, but not a marked feature in any case.	" Violent in some, active in all; only coma in fatal cases."	0	0	Not marked.	Not marked.	Pulse generally frequent, but nothing peculiar about it.	Not prominent, though a little diarrhoea in some of the cases.	Petechia distinct in 5 cases. One of the other cases was in the same family with two of these cases, and was evidently the same disease, but no crup-tion could be discovered.		4	3	0	XXXIV.	3 cases fatal in 10, 12 and 19 days; 4 recovered in from 3 to 5 weeks. XXXIV.	
" Remarks."		1 fatal less than 24 h.	1 recov. many mos.	In one only, a child.	In 3 cases. In the child stupor alternated with convulsions, and headache could not show itself.	In 2 fatal, adult. Logical answers in one until within 12 hours before death. In the other no logical answers for 48 hours before death.	Not recorded	Not recorded	In 2. In one other excessive pain.	In all 4 respiration hurried. Pain in 1.	Pulse accelerated in all 4.	Nausea and vomiting a frequent symptom. Diarrhoea in 1 fatal case.	Petechia in 3; absent in one of the three fatal cases. They appeared on various parts of the body and extremities. They consisted of small spots as of effused blood, from diameter of crow-quill to that of a lead pencil, distinct, some round, some irregular, and in no case disappearing on pressure. In the case of recovery they became (from purple) gradually a light pink, and gradually passed away.		1	3	0	Opiates, iron, stimulants, broth.	1 case was fatal in 2½ days; one was fatal in less than 24 hours; one in about one week. In the case of recovery it was months. In one case there was obtuse hearing, loss of muscular power. In the case of recovery, rheumatic disease supervened and obscured paralysis of motion, which existed for months.
5 ds.	5 ds.	5 ds.	1	Present 1 case. Logical answers to a certain extent.	0	0	0	0				Spots in moderate number, chiefly on the lower limbs. 1 case.			1	0		Excessive prostration and sinking from the first.	
	2 ds.		4	4	4	4	0	4	1	Quick and strong.		Spots in all 4. In one case a spot on the hand, another on a foot, a third on abdomen sloughed.		2	2	0	XXXV.		
4 ds.	10 ds.	7 w.	In two cases; 1 severe, 1 slight.	In 3. Constant back of head especially.	Mild in 3. Logical answers.	1	2	3	In two cases great distress in chest.	Pulse 140 to 150.	Great pain in 2 cases.	0		1	2	0	Quinine, aconite, hydriod. potassa.		
4 ds.	4 ds.	4 ds.	0	1 severe.	High first day, low muttering second day. Logical answers.	1	0	Not recorded	0	Pulse rapid and bounding at first—strong almost to the last.		1 case. Petechia large and numerous.			1	0	Case past treatment when seen.	Dr. Hoskins had another case, seen by another practitioner, among whose cases it has been given already.	
4 w.	4 w.	4 w.	1	1	1 delirious and persistently inattentive; finally comatose.	0	1	0	0	Pulse slow.	0	1 case. Purple ecchymoses on tibia.			1	0	Calomel, purging, opiates, sinapis to nucha.	Tongue white and moist.	
															3			No record of the cases had been kept.	
43 h.	43 h.	43 h.	0	1 intense.	0	0	0	Not noticed.	0	Pulse 180, very weak.	Vomiting.	Skin "pungently" hot; general mottled look on face and arms. Spots exactly like pur-pura on limbs and trunk.		1	0		Stimulants, spts. ammon. aromat.	XXXVI.	
4 ds.	4 ds.	4 ds.	1	1 severe. Pain extended down to third or fourth dorsal vertebra.	Slight in one case. Logical answers.		1	1	0	Pulse moderately accelerated.	0	0			1	0	Cathartics, counter-irritants, stimulants, anodynes.	Premonitory symptoms for three days.	
10 ds.	10 ds.	10 ds.	1	1 mild.	Some delirium constantly. Logical answers.		1	0	0	Pulse 130, weak.	0	0			1	0	Stimulants, counter-irritation to neck, cold to head.	The boy fell from a tree and struck his head and spine. Suggestion on treatment: " Experiment and study."	
about 2½ m.	about 2½ m.	about 2½ m.	No clonic spasms, hands clenched, arms strongly flexed, feet inverted	1	Delirium and stupidity. Logical answers in intervals of comparative intelligence.		1	No, but pain between shoulders.	Severe pain through upper part of chest, affecting respiration.	Pulse variable and irregular.	Vomiting; urine involuntary; then catheterism required.	At different dates, purpuric spots on the eyelids, upper part of body and arms. At one time legs and feet purple. Body and legs became dotted with a pustular eruption. Hard inflamed spots like boils, with suppurating apices, interspersed with pustules exactly resembl'g variola, but which did not dry up into a crust, but became fill'd with blood and remained so. Finally whole body became cov. with boils and abscesses, one of which was opened and gave laudable pus.		1	0		Diffusible and alcoholic stimulants, antispasmodics, opiates, iron, two leeches to temples. No apparent benefit except from stimulants and opiates.	At one time the tongue was protruded a little to the right side. There was deafness, also jactitation.	

NAMES OF TOWNS.	Names of Reporters.	No. of Cases.	Their Dates.	Sources of the Disease.	Locality. High or low, damp or dry.	Districts thickly or sparsely settl'd	Condition of Patients.	OF ADULTS.			Adolescenec.	Childhood, or Infancy.	Greatest Age.	Earliest Age.	Males.	Females.	First case in Town, so far as known by Reporter.	Last case in Town, so far as known by Reporter.	Sporadic or Epidemic.	Cases showing evidence of Contagion.	Average Duration.	Shortest Duration.	Greatest Duration.	Convulsions. No. of cases in which they occurred.	
								Adv. Age.	Mid. Age.	Age.															
Billerica, <i>Middlesex Co.</i>	F. Bundy, M.D.	2	Feb. 26, 1864. Jan. 21, —.	Both cases followed a sudden cold.	2 low, 1 damp, near a small river.	1 village, 1 house standing alone.	Easy circumstances.	29 yrs.	2	2			36 yrs.	22 yrs.	1	1	Feb. 26, 1864.	Jan. 21, 1866.	Sporadic.	0	about 5 ds.	52 h.	8 ds.	0	
S. Reading <i>Middlesex Co.</i> Lynnfield, <i>Essex Co.</i>	C. Jordan, M.D.	2 1	Dec. 4, 1864. Feb. 22, 1865.	Not known.	No preference.	Thickly settled	2 easy, 1 poor.	13 yrs.	1	1		2	21 yrs.	7 yrs.	3		R. Dec. 4, 1864; L. Feb. 22, 1865.		Sporadic.	0	10 ds. 8 h.	36 h.	4 w.	0	
Amesbury, <i>Essex Co.</i>	Thomas Sparhawk, M.D.	1	July 16, 1865.			Not thickly.	Easy.	2½ yrs.				1	2½ yrs.	2½ yrs.						Sporadic.	0	24 h.	24 h.	24 h.	1 Sometimes confined to one side, or a limb.
Boxford, <i>Essex Co.</i> Topsfield, <i>Essex Co.</i>	Justin Allen, M.D.	2	March and Nov. 1864.	Nothing definite.	No preference.	Sparsely.	Poor.	5½ yrs.				2	8 yrs.	3 yrs.	2		Mch. '64	T. Mch. '64. B. Nov. '64			0	12 ds.	3 ds.	21 ds.	
Danvers, <i>Essex Co.</i>	George Osborn, M.D.	1	Sept. 1864.	Not known.	High land.	Sparsely.	Easy.	26 yrs.	1	1			26 yrs.	26 yrs.	1		Sept. '64	Sept. '64	Sporadic.	0	12 ds.	12 ds.	12 ds.	Clonic spasms, knees drawn up stiffly.	
Medfield, <i>Norfolk Co.</i>	S. E. Stone, M.D.	1	May 5, 1865.					24 yrs.	1	1			24 yrs.	24 yrs.	1		May 5, 1865.	May 5, 1865.	Sporadic.	0	4 ds.	4 ds.	4 ds.	0	
West Roxbury, <i>Norfolk Co.</i>	Georgo Faulkner, M.D.	1	March 9, 1864.	Not known.				20 yrs.	1	1			20 yrs.	20 yrs.	1		Mch. 9, 1864.	Mch. 9, 1864.	Sporadic.		12 m.	12 m.	12 m.	1	
Roxbury, <i>Norfolk Co.</i>	G. J. Arnold, M.D.	1		Not known.	No preference.	No preference.		10 yrs.				1	10 yrs.	10 yrs.	1						Say 42 h.	Say 42 h.	Say 42 h.	1	
Walpole, <i>Norfolk Co.</i>	Eben Stone, M.D.	1	Dec. 13, 1864.	Sudden cold.	No preference.	No preference.		41 yrs.	1	1			41 yrs.	41 yrs.			Dec. 13, 1864.	Dec. 13, 1864.		0	3 ds.	3 ds.	3 ds.	1 Continued clonic spasms.	
Brookline, <i>Norfolk Co.</i>	S. Salisbury, M.D.	7	Jan. 4, 7, 14, 18, 20, 21, 29—1866.	Probably impure air.	Low and damp.	Thickly.	Easy.	8½ yrs.				Child- ren ch'fly.	20 yrs.	3 yrs.	2	5	Jan. 4, 1866.	Jan. 29, 1866.	Sporadic.	0	Fatal 48 h. Recov 10 ds.	8 h.		Not frequent.	
Dorchester, <i>Norfolk Co.</i>	J. S. Greene, M.D.	1	May 5, 1865.	Patient had played around stagnant water.		Dorchester.		4 yrs.				1	4 yrs.	4 yrs.	1						54 ds.	54 ds.	54 ds.	0	
South Weymouth, <i>Norfolk Co.</i>	F. F. Forsaith, M.D.	1	June 12, 1863.	Not known.	High land.	Sparsely.	Easy.	3 yrs.				1	3 yrs.	3 yrs.	1		June 12, 1863.	June 12, 1863.		0	7 w.	7 w.	7 w.	1	
New Bedford, <i>Bristol Co.</i>	J. Henry Jennings, M.D.	2	1864-65.						1			1			?	1									
Fairhaven, <i>Bristol Co.</i>	Geo. Atwood, M.D.	6	Feb. to May, 1865.	Not known.	No preference.	Thickly.	Easy.	10 yrs.				Chiefly.	17 yrs.	5 yrs.	5	1	Dec. '64.	May, '65	Doubtful.	0	Say 7 ds.	12 h.	Say 28 ds.	1	
Carver, <i>Plymouth Co.</i>	Benj Fearing, Jr., M.D.	1	Feb. 1865.	Not known.	Dry.	Sparsely.	Easy.	Say 22 yrs.	1	1			Say 22 yrs.	Say 22 yrs.	1										0
Barnstable, <i>Barnstable Co.</i>	H. E. McCollum, M.D.	2	May, 1858.	Supposed contagion or infection. See "Remarks."	No preference.	Sparsely.	Easy.	4 yrs.				2	5 yrs.	3 yrs.	1	1	May, '58	May, '58	Sporadic.	2 ?				0	

Average Duration.	Shortest Duration.	Greatest Duration.	Convulsions. No. of cases in which they occurred.	Headache. No. of cases in which it occurred.	Delirium. Character of.	Opisthotonus severe.	Opisthotonus slight.	Tenderness at Nucha.	Pulmonary and Pleural Symptoms.	Cardiac.	Abdominal.	Morbid Appearances of the Skin.	TERMINAT'N.	Recover'd.	Fatal.	Autopsies.	Treatment.	Remarks.
about 5 ds.	52 h.	8 ds.	0	2 very severe.	Slight in one, decided in the other. Mild in both. Logical answers in both.	2		Not noticed. But motion caused severe pain in neck in both.	0	In one pulse very variable, in the other unnoticed.		Petechiae in one, purple, from the size of a pea to that of a cent. Increased in size and became darker. The skin was not raised.		2	0		XXIX.	In both great tenderness of surface on pressure. In one, severe cramps in limbs and abdomen.
0 ds. 8 h.	36 h.	4 w.	0	Severe.	Constant. Logical answers.	0	1	2 cases.		Pulse in one, 50 per min.; in two, 120.		In two cases small purple spots over the body and limbs.		1	2	0	XXX.	
4 h.	24 h.	24 h.	Sometimes confined to one side, or a limb.				1	0		Pulse 160.		No petechiae. Skin mottled after death.		1	0		Evacuants, ether, then whisky, quinine, beef tea.	
2 ds.	3 ds.	21 ds.			Replaced by unconsciousness.	1	0							1	1	0	XXXI.	
2 ds.	12 ds.	12 ds.	Clonic spasms, knees drawn up stiffly.	1	1 case. Logical answers part of the time.	1			0			Livid, miliary petechiae, sudamina.		1	0		Cordial, tonic, opiate.	
4 ds.	4 ds.	4 ds.	0	Severe.	1 case. Logical answers. Delirium low, quiet.	0	0		Passive congestion of whole of both lungs.	Pulse very feeble, 83.		Petechiae interspersed with papules resembling urticaria over whole surface. Extensive ecchymoses on both legs and on back.		1	0		Patient seen only in last stage. Stimulants.	
1 m.	12 m.	12 m.	1	Severe.	Not marked.	0	0	0	0	Not remembered.		Petechiae over the body on the second day—some as large as a silver three cent piece.		1	0		Supporting and stimulating.	Patient died in one year after months of activity but not of recovery.
Say 2 h.	Say 42 h.	Say 42 h.	1		Almost constant. No logical answers.	1				Pulse not much disturbed		No petechiae.		1	0			
ds.	3 ds.	3 ds.	Continued clonic spasms.	1	Delirium and coma.						Vomiting.	No spots.		1	0		Stimulants, opiates, external irritants.	
fatal 8 h.	8 h.		Not frequent.	Constant and extreme in those who could describe.	Delirium and logical answers in all.	6	1	In all who could describe.	0	Pulse 120 to 130, then 100.	Constipation in all.	Not observed.		4	3	0	XXXII.	XXXII.
4 ds.	54 ds.	54 ds.	0	1	1 case. Logical answers.		1	1		Pulse 100 to 140.	Vomiting.	Bright red spots on neck, chest and abdomen—some as if made by blow from nutmeg grater.		1		0	XXXIII.	
w.	7 w.	7 w.	1	1 severe.	Constant and profound.	1								1		0	Tonics and stimulants.	"Slow recovery after wavering between life and death for three weeks. Head nearly touched the back between the scapulae."
Say ds.	12 h.	Say 28 ds.	1	Say 5.	5 cases. Logical answers.	0	2	4	2	Rheumatic carditis, 2.		Eruption like purpura in both cases.		1	?	0		
3 ds.	3 ds.	3 ds.	0	1	1						Nausea.	Two cases nearly covered with dusky rash in irregular patches, occasionally receding, like roseola.		2	4	0	Tonics, stimulants, nourishment, blister to nucha.	
			0	2	2	0	0	0				Petechiae about as large as raisins, from 2 to 6 inches apart. Resembled bruises; persisted post-mortem.		1	1	0	Cathartic, and blister to nucha. Opiates and cataplasms.	Right pupil contracted, left one dilated. Death in eight hours from onset of acute symptoms. It was infection from fomites that was inferred in this case.

NAMES OF TOWNS.	Names of Reporters.	No. of Cases.	Their Dates.	Sources of the Disease.	Locality. High or low, damp or dry.	Districts thickly or sparsely settl'd	Condition of Patients.	Average Age.	Adult Age.	OF ADULTS.			Adolescence.	Childhood or Infancy.	Greatest Age.	Earliest Age.	Males.	Females.	First case in Town, so far as known by Reporter.	Last case in Town, so far as known by Reporter.	Sporadic.	Cases showing evidence of Contagion.	Average Duration.	Shortest Duration.	Greatest Duration.	Convulsions. No. of cases in which they occurred.
										Adv. Age.	Mid. Age.	Age.														
East Brookfield, <i>Worcester Co.</i> Leicester, <i>Worcester Co.</i>	E. M. Wheeler, M.D.	1 1	April, 1864. July, 1865.		No preference.	Rather thickly settled for country town.	Easy circumstances.	27 yrs.	1		1	1		37 yrs.	17 yrs.	2			April, 1864.	July '65.	Sporadic.	0	4 w.	2 w.	6 w.	0
Brookfield, <i>Worcester Co.</i>	J. T. Rood, M.D.	1	March 16, 1865.	Not known.	No preference.	Thickly settled for country town.	Poor.	6 yrs.					1	6 yrs.	6 yrs.		1	Feb. 4, 1865.	Mar. 16, 1865.	Sporadic.	0	8 h. to convales.	8 h. to convales.	8 h. to convales.	8 times an hour on an average.	
Barre, <i>Worcester Co.</i>	C. W. Whitcomb, M.D.	1	April 6, 1864.	Not known.	Side hill near Ware River.	Sparsely.	Poor.	4 m.					1	4 m.	4 m.		1	April 6, 1864.	Apr. 6, 1864.	Sporadic.	0	45 ds.	45 ds.	45 ds.	1 case.	
Westminster, <i>Worcester Co.</i> Fitchburg, <i>Worcester Co.</i>	Geo. D. Colony, M.D.	1 1	March 28, 1865. April 13, 1865.	Not known.	No preference.	1 thickly settl. 1 sparsely.		12 yrs.								2	July, '64 Fitchb'g	Apr. '65	Sporadic.	0	about 2 ds.	18 h.	3 ds.	0		
Worcester, <i>Worcester Co.</i>	Benj. F. Heywood, M.D.	4	1 March, 1864. 1 Feb. 21, " 1 Nov. 22, "	Not known.	No preference.	No preference.	No preference.	about 32 yrs.	2	1	1	15 yrs. each.		60 yrs.	15 yrs.	3	1	Mch. —	Nov. '64	Sporadic.	0	3 ds. fatal.	3 w. recov.		3 cases out of 4.	
Worcester, <i>Worcester Co.</i> Sutton, <i>Worcester Co.</i>	Oramel Martin, M.D.	2 1	Jan. 1864. Feb. " April, "	Not known.	No preference.	1 sparsely. 2 thickly.	Easy.	14 yrs.					2	1	19 yrs.	4 yrs.	3	Jan. '64.	1864.	Sporadic.	0	2 m.	2 w.	1 nev. fully recov.	3 cases.	
Leominster, <i>Worcester Co.</i>	C. C. Field, M.D.	1	March, 1862.	Ditto. Subject taken 36 hours after arrival from camp at Annapolis, where he had been on a visit.	[See last heading.]	[See last heading.]	Easy.	8 yrs.					1	8 yrs.	8 yrs.	1		Mch. '62	1865.	Sporadic.	0	8 w. to convalescence.	More than yr. to full health.		1 case confined to back and one side eight weeks after attack before they ceased.	
Upton, <i>Worcester Co.</i>	G. W. Ward, M.D.	1	April 4, 1864.	Fall.				2 yrs.					1	2 yrs.	2 yrs.	1						0	42 ds.	42 ds.	42 ds.	0
Upton, <i>Worcester Co.</i>	C. A. Wilcox, M.D.	1	March 15, 1864.	Work in a hot room.			Easy.	25 yrs.	1	1			25 yrs.	25 yr.	1						Sporadic.	0	3½ ds.	3½ ds.	3½ ds.	0
Charlestown, <i>Middlesex Co.</i>	S. H. Hurd, M.D.	2	April, 1864.	Not known. Possible contagion suggested.	No preference.	Thickly.	Poor.	8 yrs.					2	10 yrs.	6 yrs.	1	1				Sporadic.	?	about 7 w.	3 w.	11 w.	2 cases.
E. Cambridge, <i>Middlesex Co.</i>	Anson Hooker, M.D.	1	Feb. 1864.						1								1			Sporadic.	0					
Cambridge, <i>Middlesex Co.</i>	J. B. Taylor, M.D.	2	Dec. 1864.	Not known.	No preference.	Thickly.	Poor.	16 yrs.	1	1	1	20 yrs.	13 yrs.		2	Dec. '64	Dec. '64	Sporadic.	0	10 ds.	10 ds.	10 ds.	0			
Cambridge, <i>Middlesex Co.</i> Somerville, <i>Middlesex Co.</i>	J. R. Morse, M.D.	2 2	1 st Jan. 1865. 2 Mar. " 1 Apr. "	One case (Mch.) had spent two days at Gallop's Island.	No preference. 2 on high ground, 2 on low.	Sparsely.	Easy.	11 yrs.					1	1	17 yrs.	7 yrs.	4	Jan. '65.	Apr. '65.	Sporadic.	0	13 ds. and 10 h.	40 h.	30 ds.	2 cases.	
Feltonville, in Marlboro', <i>Middlesex Co.</i>	C. W. Barnes, M.D.	2	Oct. 2, 1864. Jan. 4, 1865.	Not known.	No preference.			13 yrs.					1	1	16 yrs.	10 yrs.	2	Oct. 2, 1864.	Jan. 4, 1865.	Sporadic.	0	36 h.	36 h.	36 h.	1	

Average Duration.	Shortest Duration.	Greatest Duration.	Convulsions. No. of cases in which they occurred.	Headache. No. of cases in which it occurred.	Delirium. Character of.	Opisthotonus severe.	Opisthotonus slight.	Tenderness at Nucha.	Pulmonary and Pleural Symptoms.	Cardiac.	Abdominal.	Morbid Appearances of the Skin.	TERMINAT'N.		Autopsies.	Treatment.	Remarks.	
													Recov'd.	Fatal.				
4 w.	2 w.	6 w.	0	2 cases early in the disease.	Slight in both. Logical answers.	0	Both.	Both; extreme in one.	None.	Pulse at first quick, afterwards normal.		In 1 case a few petechiae on chest and abdomen.	2	0	XXI.	XXI.		
8 h. to convales.	8 h. to convales.	8 h. to convales.	8 times an hour on an average.	1 case.	Constant for eight hours. No answers.	Very severe.			Respiration excessively labored.	Pulse very small and rapid.		The right half of the body completely covered with petechiae; the division on the face was perfect; on the back and side the eruption was purple, also on the forehead. As soon as the patient began to improve, the eruption began to subside, and in 24 hours completely disappeared.	1	0	XXII.			
45 ds.	45 ds.	45 ds.	1 case.	Unknown.	Unknown.		Constant.	Not observ'd	None.	None observed.	Nausea and constipation.	No petechiae or other morbid appearance could be found.	1	0	Calomel and soda only.			
about 2 ds.	18 h.	3 ds.	0	Severe in both.	More or less in both, with gradual loss of consciousness. Questions answered during first stage.		Both.	0	In 1, respiration hurried and painful.	Heart's action violent; pulse rapid and full in both cases.		Dark spots in both, rapidly increasing—in one closely resembling measles in shape. In one case, over body generally, in the other confined to extremities and petechial.	2	XXIII.	Stimulation.			
3 ds. fatal.	3 w. recov.	3 cases out of 4.		Severe in all 4.	In 3 out of the 4. Logical answers in 2. Delirium low muttering.	In all 4.		Not noticed.		Pulse 90 to 100.	Nausea and vomiting at commencement.	Not marked.	2	2	0	XXIV.		
2 m.	2 w.	1 nev. fully recov.	3 cases.	3 cases back part of head.	In all 3. Seemed idiotic. No logical answers.	1 decubitus abdominal.	2	In all 3. Also pain increased by motion.				Petechiae in all.	3	0	XXV.	XXV.		
8 w. to convalescence. More than yr. to full health.		1 case confined to back and one side; eight weeks after attack before they ceased.		1 case.	Constant for two weeks. Logical answers seldom. Delirium low muttering.		1 prolonged.	1	Pneumonia in third week for a week.	Pulse 120.		Skin mottled—dark spots on different parts of the body.	1	0	XXVI.			
42 ds.	42 ds.	42 ds.	0	Not remembered.	1 case.		Slight, but continuous.	1				Petechiae.	1	0				
3½ ds.	3½ ds.	3½ ds.	0	Severe, and paroxysmal at back part of head.	1 case. Logical answers. Delirium low muttering.		1 case disp. to throw head back.	1 case, also pain.		Pulse weak, rapid, variable.	Constipation	None.		1	0	XXVII.		
about 7 w.	3 w.	11 w.	2 cascs.	Constant in both cases.	2 cases. Logical answers.	0	0	2 cases.	0	Pulse rapid and feeble.		Petechiae very marked in both.	2	0	Expectant.			
				1 case.	1 case.			1 case.				Petechiae.	1	0				
10 ds.	10 ds.	10 ds.	0	Severe in both.	None.	1 case.	0	1 case.	0	Pulse very rapid.		Not marked.	2	0	Narcotics, stimulants, local bleeding, tonics.			
13 ds. and 10 h.	40 h.	30 ds.	2 cases.	Severe in all 4.	3 cases. Logical answers in one case of the 3 delirious.	2 cases.	2 cases.	In all 4.	0		Obstinate constipation in 1 case.	Petechiae in 2 cases, darkish brown, remained only a few hours.	2	2	0	Diffusible stimulants and alteratives, tonics, counter-irritants.	1 fatal, 30 days. 1 " 40 hours, 1 reRecovered, 10 days. 1 " 12 days.	
36 h.	36 h.	36 h.	1	1 severe till death; 1 for first 12 hours.	1 only—logical ans.	0	1 case.	Not noticed.						2	0		XXVIII.	

NAMES OF TOWNS.	Names of Reporters.	No. of Cases.	Their Dates.	Sources of the Disease.	Locality. High or low, damp or dry.	Districts thickly or sparsely settl'd	Condition of Patients.	Average Age.	OF ADULTS.			Adolescence.	Childhood or Infancy.	Greatest Age.	Earliest Age.	Males.	Females.	First case in Town, so far as known by Reporter.	Last case in Town, so far as known by Reporter.	Sporadic or Epidemic.	Cases showing evidence of Contagion.	Average Duration.	Shortest Duration.	Greatest Duration.	Convulsions. No. of cases in which they occurred.	Headache. No. of cases in which it occurred.		
									Adult Age.	Adv. Age.	Mid. Age.																	
Westfield, Hampden Co.	Geo. G. Tucker, M.D.	16	8 winter and spring of 1858. 8 from '61 to '65.		Wholly dry and high.	Country town. Sparsely.	See "Re- marks."							38 yrs.	2½ m.	See "Re- marks."		Feb. '57.		Epidemic.	0		12 h.	3 m. Fatal.	Spasmodic action frequent.	Frequent.		
Westfield, Hampden Co.	J. G. Abbott, M.D.	3	1859.		ditto.	Sparsely.	Easy circumstances.	about 35 yrs.	3		3			50 yrs.	30 yrs.		3						4 ds.					
Greenfield, Franklin Co.		3	1864.																									
Westfield, Hampden Co.		5	1861.																									
Springfield, Hampden Co.	W. G. Breck, M.D.	10	2 in '62; 3 in '63; 3 in '64 (Mch. and Apr.); 2 in '65.	Not known.	No preference.	No preference.	No preference.	Say 15 yrs.	See "Re- marks."					35 yrs.	5 yrs.	Of 10 cases in Sprigf 6	4	Springf. 1862.	Springf. April, 1865.	Epidemic. " Sporadic.	0	3 m.	1 m.	8 m.	A frequent occurrence.	Constant and severe.		
Springfield, Hampden Co.	M. Calkins, M.D.	1	March, '65.	Not known.	Damp.	Thickly.	Poor.	Say 35 yrs.	1		1			Say 35 yrs.	Say 35 yrs.	1		Feb. '65.	Apr. '65.	Sporadic.	0	2 w.	2 w.	2 w.	"Cramps!" in the arms and hands.	Severe, principally in the occipital region.		
Monson Almshouse, Hampden Co.	J. D. Nichols, M.D.	2	17th and 18th May, '65.	Not known.	No preference.	Almshouse on a hill by itself.	Almshouse.	5 yrs.						2	7 yrs.	3 yrs.	1	1			Epidemic in town.	0	In wards distant inter se.	25 h.	24 h.	26 h.	2 cases.	
Monson, Hampden Co.		1	Feb. 9 to Mch. 5, 1865.																									
Palmer, Hampden Co.	Wm. Holbrook, M.D.	8		Not known.	No preference.	No preference.	No preference.	8 yrs.																				
Palmer, Hampden Co.		12	Feb. 10 to Apr. 1, 1865.																									
Monson, Hampden Co.	Samuel Shaw, M.D.	2		Not known.	No preference.	No preference.	No preference.	No preference.	20 yrs.	4				10 fr. 7-12 yrs.	35 yrs.	5 yrs.	7	7	2 cases 1858.	Apr. 4, 1865.	Epidemic.	0	5 ds.	22 h.	7 ds.		In all.	
Athol, Worcester Co.	J. P. Lynde, M.D.	5	2 in March, 1 in April, 1 in Dec., 1864. 1 in Jan. 1865.	Not known.	No preference.	No preference.	No preference.	about 10 yrs.						5	14 yrs.	7 yrs.	2	3	Mch. '64 Aug. '65		Sporadic.	0	39 h.	24 h.	52 h.	2 cases. In one early, in the other late in the disease.	Severe in all 5, in forehead.	
Athol, Worcester Co.	Ditto (additional).	1	Aug. 1865.																									
Petersham, Worcester Co.	F A. Wood, M.D.	4	1864.	Not known.	The whole town is high.	Sparsely.	No preference.	11 yrs.																			All 4 cases. With outcries in every case.	
Dana, Worcester Co.		1	Hardwick, Feb. 16, 1864, Feb. 18, " Mch. 3, " " 9, " 11, " 8, " Feb. 12, 1865, " 17, " Apr. 21, " Dana, Mch. 1, '64. N. Braintree, Apr. 26, 1864.																									
New Braintree, Worcester Co.	Almon M. Orcutt, M.D.	1		Not known.	No preference.	Sparsely.	No preference.	27 yrs.	No pref. betw. adults and children.						53 yrs.	6 yrs.	6	5	Feb. 16, 1864. Hardwick.	Apr. 21, 1865. Hardwick.	Epidemic.	0	18 ds.	5 ds.	45 ds.		Severe in all; "terrible" in 3 fatal cases.	
New Braintree, Worcester Co.	S. P. Martin, M.D.	2	Mch. 2, 1864. " 23, " " 14, " Oct. 13, "	Not known.	No preference.	Sparsely.	4 easy circum-	about 32 yrs.	2	1	1			2	65 yrs.	6 yrs.			March, 1864. New Br.		Sporadic.	0	about 18 ds.	2 ds.	38 ds.	4 cases. Most frequent in the 2 children.	All 4, but not severe.	

Shortest Duration.	Greatest Duration.	Convulsions. No. of cases in which they occurred.	Headache. No. of cases in which it occurred.	Delirium. Character of.	Opisthotonus severe.	Opisthotonus slight.	Tenderness at Nucha.	Pulmonary and Pleural Symptoms.	Cardiac.	Abdominal.	Morbid Appearances of the Skin.	TERMINAT'N.			Treatment.	Remarks.	
												Recover'd.	Fatal.	Autopsies.			
12 h.	3 m. Fatal.	Spasmodic action frequent.	Frequent.	Generally occurred. Logical answers in those <i>not</i> suddenly attacked. In cases of sudden invasion, no.	Say 6 easess.	Say 10 cases, i. e. some in all.		Slight bronchial irritation, and congestion in some cases.	None well marked.	Costiveness. Slight diarrhea, flatulence in some.	Not mentioned.	4	12	8 See XI.	XI.	XI. Young lads for most part.	
	4 ds.												2	1	0	XII.	
1 m.	8 m.	A frequent occurrence.	Constant and severe.	More or less in every case. Logical answers occasionally.	In every case.	0		Not observed.	Pulse varions.		In every case petechiae, being purple or copper-colored, from size of a pin's head to that of a half dollar. <small>*Greenf. and Westf. not mentioned.</small>				XIII.	3 cases in Greenfield, adults. 5 in Westfield, children and adults. 10 in Springfield, under 12 yrs. XIII.	
2 w.	2 w.	"Cramps" in the arms and hands.	Severe, principally in the occipital region.	Slight.			Great soreness, stiffness and tenderness.						1		0	XIV.	
24 h.	26 h.	2 cases.		Both patients comatose.	1	1						Petechia in 1 ease.		2	0	Counter-irritants to the spine—veratrum viride.	
12 h.	5 w.	Most of the cases; some early, others late in the disease.	Several complained of severe headache; others but little.	More or less in nearly all the cases. Logical answers sometimes, at other times comatose state.	Opisthotonus in nearly all. 1 or 2 only slightly.	9	Hurried respiration, as a general statem't.	Pulse rapid, increasing to 150 and 175.			None had petechiae during life; after death 2 or 3 had spots like purpura, and 1 or 2 had a purple or leaden color.	4	5	0	XV.		
22 h.	7 ds.		In all.	In all the cases not relieved in the first 24 hours. Logical answers.	2 cases.	4 cases.	Say 10 cases.	0	Pulse wiry, very rapid, often 150.		No petechiae during life. In 1 case discoloration of the skin after death.	12	2	0	XVI.		
24 h.	52 h.	2 cases. In one early, in the other late in the disease.	Severe in all 5, in forehead.	In all 5 cases. Logical answers for a time; afterwards stupor.	1 ease.	2 easess.	Not observ'd and not looked for.	Respiration hurried and sighing.	Pulse very rapid, sharp and feeble. Action of heart "feeble and oppressed."	Vomiting.	Skin livid or purple, puffy. Eruption of rose spots or petechiae, size of split pea; pur. not disp. on pres.—over trunk and ext'r.	5		0	Expectant, supporting, stimulating.		
31 h.	31 h.	0			0	0		Respiration excessively hurried.	Pulse very rapid.	Vomiting.	Skin livid and purple—at first, cold.	1		XVII.	Stimulating.		
3 ds.	4 ds.	All 4 cases. With outcries in every case.	All 4 cases.	In all 4 cases. Logical answers in only 1 case. That recovered.	In all 4.		In 3 cases.	0	Pulse not mentioned.	Vomiting generally in first stage.	No spots.	1	3	0	XVIII.		
5 ds.	45 ds.		Severe in all; "terrible" in 3 fatal cases.	In all 11 cases. In the 8 recoveries, logical answers. In one of the fatal cases also. In the other two fatal cases, no logical answers.	In all 3 fatal cases.	In all 8 recoveries.	In all 11 cases.	More or less frothy expectoration, with occasional "bastard pleurisy."	Pulse in early stage feeble; in stage of re-action, fuller, but not very frequent.	Vomiting in all. Constipation, with retention or suppression of urine, frequent.	Spots not particularly marked. Where any portion of the body rested upon the bed-clothes there would be a spot. In the earlier stages of the 3 fatal cases, the skin had a mottled appearance.	8	3	0	XIX.	1 relapse, fatal. Robust and feeble had the same appearance soon after attack.	
2 ds.	38 ds.	4 cases. Most frequent in the 2 children.	All 4, but not severe.	All more or less. All gave logical answers.	3 cases; 1 adult, 2 children.	1	All 4.		Pulse in the 2 children rapid, and feeble in the 2 adults—from 80 to 100.		0		4	0	XX.		

Names of Towns.	Names of Reporters.	No. of Cases.	Their Dates.	Sources of the Disease.	Locality. High or low, damp or dry.	Districts thickly or sparsely settl'd	Condition of Patients.	Average Age.	Of Adults.		Adolescence.	Childhood or Infancy.	Greatest Age.	Earliest Age.	Males.	Females.	First case in Town, so far as known by Reporter.	Last case in Town, so far as known by Reporter.	Sporadic or Epidemic.	Cases showing evidence of Contagion.	Average Duration.	Shortest Duration.	Greatest Duration.	Convulsions, No. of cases in which they occurred.	Headache, No. of cases in which it occurred.
									Adv. Age.	Mid. Age.															
Becket, <i>Berkshire Co.</i>	E. G. Wheeler, M.D.	8	Apr. 5, '57, —1 case 7, " 1 Oct. 31, " 1 Mch. 6 to 14, '58, 5 cases.	Not known.	Six cases in a hollow where 3 small streams meet; seven milldams in village. Two cases high and dry.	No preference.	All in easy circumstances.	about 4			about 4	45 yrs.	5 m.	5	3	Apr. 5, 1857.	Mar. 14, 1858.	In 1857, sporadic. In 1858, epidemic.	0	Less than 3 ds.	12 h.	3 ds.	All 8 cases.	Violent in all who were sensible—7 cases.	
Pittsfield, <i>Berkshire Co.</i> Adams, <i>Berkshire Co.</i> Hinsdale, <i>Berkshire Co.</i>	Wm. W. Greene, M.D.	5	In 1863 1 case. 6 cases '64 to '65.	Not known.	No preference.	No preference.	No preference.	25 yrs.	4	Chiefly.	3	45 yrs.	24 yrs.	5	2	Feb. '63 Pittsfi'l'd	June '65 Pittsfi'l'd	Sporadic.	0	About 15 ds.	2 ds.	21 w. to convales.	In 4 out of the 7: i.e. in all the children and 1 adult.	In all 7.	
Shutesbury, <i>Franklin Co.</i> Leverett, <i>Franklin Co.</i> Belchertown, <i>Hampshire Co.</i> Amherst, <i>Hampshire Co.</i>	David Rice, M.D.	1 1 1 1	1 in Ap., 1 in May, 2 in June, 1865.	Supposed to be the same as those of diphtheria.	No preference.	Sparsely.	All in easy circumstances.	40 yrs.	4	Chiefly.		65 yrs.	35 yrs.	4	0	June '65 Leverett	June '65 Leverett	Sporadic.	0	3 w.	3 w.	3 w.	0	Severe pain in the head of all 4, extending down the spine.	
Montague, <i>Franklin Co.</i>	D. Bradford, M.D.	1	Jan. 13, 1864.	Exposure to cold nights.	High, dry.	Sparsely.	Poor.	18 yrs.			1	18 yrs.	18 yrs.	1		Jan. 13, 1864.		Sporadic.	0	5 ds.	5 ds.	5 ds.	0	1	
Prescott, <i>Hampshire Co.</i>	David Rice, M.D.	1	July, 1865.	Patient, a physician; saw a case of the disease two weeks before his attack.	High and dry. Typhoid fever prevails much.	Village, sparsely.	Easy circumstances.	38 yrs.	1	1		38 yrs.	38 yrs.	1				Sporadic.	Yes ? See Sources.	2 w.	2 w.	2 w.	0	Severe pain in head, and extending whole length of spinal column.	
Heath, <i>Franklin Co.</i> Rowe, <i>Franklin Co.</i> [Whitingham, State of Vermont.]	C. Temple, M.D.	1 1 2	Feh. 1 to July 1, 1864.	Not known.	High.	Sparsely.	No preference.	28 yrs.	Chiefly.	Chiefly.	1	55 yrs.	11 yrs.	4		Feb. '64.	Apr. '64.	Epidemic.	0	19 ds.	4 ds.	60 ds.	1	In all 4 very severe.	
Westfield, <i>Hampden Co.</i>	James Holland, M.D.	17	Jan. '58, 1 case. Feb. 5 Mch. 3 Apr. 3 Jan. '65, 1 Feb. 1 Mch. 1 Apr. 1 July 1	" Some peculiar condition of the atmosphere" in 1858. In 1865, the 5 cases traceable to over-exertion and exposure to cold and wet.	No preference.	No preference.	No preference.	19 yrs.	Of 12, ch'fly adults.			5	72 yrs.	11 m.	The 12 in '58 not mention'd. In '65 In '65. 4 1	Jan. '58.	July '65.	In 1858, epidemic. In 1865, sporadic.	0	About 33 ds.	20 h.	163 ds	0	Severe pain in head, and extending down neck and back, in every case where the sufferer could speak.	
Williamsburg, <i>Hampshire Co.</i>	W. M. Trow, M.D.	1	Dec. 4, 1863.	Not known.	No preference.	Village, sparsely.	Easy circumstances.	39 yrs. about.	1	1		39 yrs.	39 yrs.	1		Dec. 4, 1863.	Dec. 4, 1863.	Sporadic.	0	36 h.	36 h.	36 h.	0	Very severe.	
Northampton, <i>Hampshire Co.</i>	A. W. Thompson, M.D.	6	Feb. 27 to April 28, 1864.	Contagion supposed, except the first case.	Low and damp.	Medium.	Poor.	33 yrs.	6	2	4		50 yrs.	23 yrs.	2	4	Feb. 27, 1864.	Apr. 28, 1864.	Sporadic.	Yes.	3 w.	2 w.	4 w.	0	In 6 cases, lit one intense.
Granby, <i>Hampshire Co.</i> Ludlow, <i>Hampshire Co.</i> Belchertown, <i>Hampshire Co.</i>	L. E. Marsh, M.D.	12 1 2 1 3 2 1 1 1 1 1 1	1 in Oct. 1862. 1 Apr. 1864. 2 Mch. 1865. Fch. " 3 Apr. " 3 May. " 1 Junc. " 1 July. " 1 Aug. "	Theory of poison in atmosphere.	No preference.	No preference.	No preference.			The adults mostly.	Chiefly.	45 yrs.	4 m.	7	8	Oct. '62 Granby.	Aug. '65 Granby.	Sporadic.	0	8 ds.	24 h.	6 w.	In 2 cases.	Violent in every case.	
Greenwich, <i>Hampshire Co.</i>	J. W. Goodell, M.D.	7	1 Jan. 19, 1865. 1 24, " 1 1 28, " 1 1 29, " 1 2 Fch. 3, " 1 1 5, " 1	Not known. Followed severe cold weather. See "Remarks."	Dry plain.	Sparsely.	Easy circumstances.	19 yrs.		The adults mostly.	Chiefly.	63 yrs.	2 yrs.	3	4	Jan. 19, 1865.	Feb. 5, 1865.	Epidemic.	0	about 4 d.	12 h.	7 ds.	4	Say 5 in back of head.	

Average Duration.	Shortest Duration.	Greatest Duration.	Convulsions. No. of cases in which they occurred.	Headache. No. of cases in which it occurred.	Delirium. Character of.	Opisthotonus severe.	Opisthotonus slight.	Tenderness at Nucha.	Pulmonary and Pleural Symptoms.	Cardiac.	Abdominal.	Morbid Appearances of the Skin.	TERMINAT'N.		Antopses.	Treatment.	Remarks.
													Rec'd.	Fatal.			
Less than 3 ds.	12 h.	3 ds.	All 8 cases.	Violent in all who were sensible—7 cases.	In all 8 cases—wild in 1. In the other 7 cases, logical answers till coma set in.	6 cases.	2 cases.	In 5 cases; the others unconscious when seen.	In 2 cases respiration laborious and irregular.	In 6 cases, pulse feeble, frequent, thready. In 2 some "reaction."	In 3 cases, severe pain in bowels, and vomiting at outset.	Petechiae in all, and great sensibility and soreness of the cutaneous surface.		8	None.	I.	I.
About 15 ds.	2 ds.	21 w. to convales.	In 4 out of the 7: i.e. in all the children and 1 adult.	In all 7.	In 5 out of the 7. 4 out of the 5 gave logical answers.	6 out of 7.	1 out of 7.	In all extreme.	None marked. 0	Pulse rapid, sufficiently strong.		In all but 1, 6 out of 7, irregularly shaped spots, varying in size from a millet seed to a split bean; rose color or darker; not disappearing on pressure.	4	3 See II.	II.	II.	
3 w.	3 w.	3 w.	0	Severe pain in the head of all 4, extending down the spine.	Mild delirium, tending to coma, in 1 case only. Logical answers.	0	2	In all.	Difficult respiration in 4. Pain in chest in 1.	"Pulse in one, 40 for several days, with coma and much irregularity."	0	0	4	0	III.	III.	
5 ds.	5 ds.	5 ds.	0	1	Delirium most of the time. Logical answers occasionally.	1	0	1	Cough..	Pulse 100 to 125.		Petechiae last 3 days, and at death livid or purplish spots, mostly on trunk.		1 0		IV.	
2 w.	2 w.	2 w.	0	Severe pain in head, and extending whole length of spinal column.	Obtuseness of intellect with disposition to coma. Could be roused at any time.	0	0	1 great.	0	Pulse very variable, 40 to 100.	0	0	1 0		Revulsives, epispastics, stimulants, tonics.	Convalescence slow.	
19 ds.	4 ds.	80 ds.	1	In all 4 very severe.	In all 4. Logical answers in one only:	3	1	4		Pulse small, frequent, hard.	0	All 4 cases petechiae. In 3 appeared the 2d day on the body, but little on the limbs. In the other case only on the back, and were of a very dark purple color.	1 3 0		V.	The cases in Whitingham, Vt., cannot be separated from the others in the answers to the Circular. See also V.	
About 33 ds.	20 h.	163 ds	0	Severe pain in head, and extending down neck and back, in every case where the sufferer could speak.	Delirium present more or less in all the 17 cases. Its character was very variable. For the most part, however, shown in low muttering. Logical answers generally.	In all the 12 cases of '58. Not mentioned in those of 1865. See "remarks."	Slight in no case.	In all more or less.	In most cases, constriction at chest; respiration often hurried and laborious. In no case were the lungs or pleurae involved.	No morbid changes in heart before or after death. In first stage, pulse rapid, small, and in many cases imperceptible. Afterwards variable.	Sense of constriction.	In every case in '58; none in '65. Bright red spots after a few h., becoming purple or livid, on face, neck, trunk and limbs; numerous in most cases; form irregular; size from 2 to 12 l. dia. not raised. In 1 case spots disappear end of 3d w. but on 7th w. returned in greater num. This patient, a boy of 9 y. died 10th w.	In '58, 11 out of 12 died.	In '65, 3 out of 5 died.	VI.	VI.	VI. 5 relapses, 3 of them fatal. The 5 cases in 1865, children.
36 h.	36 h.	36 h.	0	Very severe.	Brief.	0	0	0	0	Pulse very small and frequent.	0	0	1 0		Alterative and stimulant.	VII.	
3 w.	2 w.	4 w.	0	In 6 cases, in one intense.	In 2 out of 6 cases, active. In 1, no logical answers.	0	2	1 fol. by paralysis of muscles of neck.	Pneumonia in 4, pleuro-pneumonia in 1.	Pulse rapid in 4 cases. 1 tympanites.		Petechiae in 3 cases. In one, face and neck, dark mahogany color, looking as if "struck with a nutmeg grater." Spots desq. lividity	6	0		VIII.	VIII.
8 ds.	24 h.	6 w.	In 2 cases.	Violent in every case.	In almost all the cases; generally low muttering. Logical answers in almost all.	Say 3 cases.	Say 10 cases.	In nearly all.	Say 7 cases. See "Remarks."	Pulse extremely rapid in all. From 120 to 200.	Nausca in 1 case.	In say 7 cases, spots like those in typhoid fever.	10 5 0			IX.	IX.
about 4 d.	12 h.	7 ds.	4	Say 5 in back of head.	2 cases, logical answers at times.	4	2	0	In 1 only—in that well marked pneumonia 3 days before any symptom of meningitis.	Heart's action very feeble. Pulse fluttering and intermittent.	In 6 cases bowels costive. Vomiting & purging in other.	Petechiae well marked in all.	0 7 0		X.	X.	

RESULTS OF THE TABLES.

BERKSHIRE COUNTY.*

THE towns from which affirmative replies have been received, are : Adams, 1 case, population 6,924; † Becket, 8 cases, population 1,578 ; Hinsdale, 1 case, population 1,511 ; Pittsfield, 5 cases, population 8,045.

No. of above towns,	4
“ “ towns negatively reported,	5
“ “ “ unheard from,	22
Whole No. of towns in County,	<hr/> 31
Proportion of towns affirmatively reported, to the number of towns in the County, about	$\frac{1}{8}$
No. of cases reported from County,	15
Population of County,	55,120
Proportion of cases reported, to population of County, about	1 in 3,674

FRANKLIN COUNTY.

The towns from which affirmative replies have been received, are : Greenfield, 3 cases, population 3,198 ; Heath, 1 case, pop. 661 ; Leverett, 1 case, pop. 964 ; Montague, † 1 case, pop. 1,593 ; Rowe, 1 case, pop. 619 ; Shutesbury, 1 case, pop. 798.

* Dr. Babbitt, of the Committee, writes (since these calculations were completed) that there is but little knowledge of the disease in the County; but reports two additional cases in the hands of an irregular practitioner in Adams.

† The statements of population are on the basis of the census of 1860.

‡ Five additional cases in Montague in 1864, reported since these calculations were made, will be given hereafter.

No. of above towns,	6
“ “ towns negatively reported,	4
“ “ “ unheard from,	16
	<hr/>
	26
Proportion of towns affirmatively reported, to whole No. of towns in County, between $\frac{1}{4}$ and $\frac{1}{5}$	
No. of cases reported from County,	8
Population of County,	31,434
Proportion of cases reported, to population of County, as	1 in 3,929

HAMPSHIRE COUNTY.*

The towns from which affirmative replies have been received, are: Amherst, 1 case, pop. 3,206; Belchertown, 3 cases, pop. 2,709; Granby, 12 cases, pop. 907; Greenwich, 7 cases, pop. 699; Northampton, 6 cases, pop. 6,788; Prescott, 1 case, pop. 611; Williamsburg, 1 case, pop. 2,095.

No. of above towns,	7
Indirectly reported (Hadley) affirmative,	1
	<hr/>
No. of towns negatively reported,	2
“ “ “ unheard from,	13
	<hr/>
	23
Proportion of towns affirmatively reported, to the whole No. of towns in the County, about	$\frac{1}{3}$
No. of cases directly reported from County,	31
Population of County,	37,823
Proportion of cases reported, to population of County,	as 1 in 1,220

* Four cases were received May 25, 1866 (after the completion of the report which occurred in South Hadley and Granby, December, 1864, March, 1865, and January, 1866. See Appendix.

HAMPDEN COUNTY.

The towns from which affirmative replies have been received, are: Monson, 5 cases, pop. 3,164; Palmer, 20 cases, pop. 4,082; Springfield, 11 cases, pop. 15,199; Westfield, 41 cases, pop. 5,055; Ludlow, 1 case, pop. 1,174.

No. of above towns,	5
Indirectly reported (Russell) affirmative,	1
	<hr/>
	6
No. of towns negatively reported,	4
" " " unheard from,	11
	<hr/>
	21

Proportion of towns affirmatively reported, to whole No. of towns in County, between $\frac{1}{3}$ and $\frac{1}{4}$	78
No. of cases directly reported from County,	78
Population of County,	57,366
Proportion of cases reported, to population of County, as	1 in 735

WORCESTER COUNTY.

The towns from which affirmative replies have been received, are: Athol, 6 cases, pop. 2,604; Barre, 1 case, pop. 2,973; Brookfield, including East Brookfield, 2 cases, pop. 2,276; Dana, 1 case, pop. 876; Fitchburg, 1 case, pop. 7,805; Hardwick, 9 cases, pop. 1,521; Leicester, 1 case, pop. 2,748; Leominster, 1 case, pop. 3,522; New Braintree, 2 cases, pop. 805; North Brookfield, 1 case, pop. 2,760; Oakham, 2 cases, pop. 959; Petersham, 4 cases, pop. 1,465; Sutton, 1 case, pop. 2,676; Upton, 2 cases, pop. 1,986; Westminster, 1 case, pop. 1,840; Worcester, 6 cases, pop. 24,960.

No. of above towns,	16
" " towns negatively reported,	16
" " " unheard from,	26
	<hr/>
	58

Proportion of towns affirmatively reported, to whole No. of towns in County, between $\frac{1}{3}$ and $\frac{1}{4}$	
No. of cases reported from County,	41
Population of County,	159,659
Proportion of cases reported, to population of County, as	1 in 3,894

MIDDLESEX COUNTY.

The towns from which affirmative replies have been received, are : Billerica, 2 cases, pop. 1,776 ; Cambridge, including East Cambridge, 5 cases, pop. 26,060 ; Charlestown, 2 cases, pop. 25,065 ; Marlborough, 2 cases, pop. 5,911 ; South Reading, 2 cases, pop. 3,207 ; Somerville, 2 cases, pop. 8,025.

No. of above towns,	6
" " towns negatively reported,	32
Doubtful report from Framingham,	1
Towns unheard from,	13
	—
	52

Proportion of towns affirmatively reported, to whole number of towns, about	$\frac{1}{9}$
No. of cases reported from County,	15
Population of County,	216,354
Proportion of cases reported, to population of County, as	1 to 14,423

ESSEX COUNTY.

The towns from which affirmative replies have been received, are : Amesbury, 1 case, pop. 3,877 ; Boxford, 1 case, pop. 1,020 ; Danvers, 1 case, pop. 5,110 ; Lynnfield, 1 case, pop. 866 ; Topsfield, 1 case, pop. 1,292.

No. of above towns,	5
Indirectly reported affirmative, by Georgetown,	1
	—
Doubtfully reported, Haverhill,	1

No. of towns negatively reported,	17
" " " unheard from,	10
	—
	34
Proportion of towns affirmatively reported, to	
whole number of towns in County, between $\frac{1}{5}$ and $\frac{1}{6}$	
No. of cases <i>directly</i> reported from County,	5
Population of County,	165,611
Proportion of cases reported, to population	
of County, as	1 in 33,122

NORFOLK COUNTY.

The towns from which affirmative replies have been received (excluding Brookline, with 7 cases occurring in 1866), are: Dorchester, 1 case, pop. 9,769; Medfield, 1 case, pop. 1,082; Roxbury, 3 cases, pop. 25,137; Walpole, 1 case, pop. 2,037; West Roxbury, 1 case, pop., 6,310; Weymouth, 1 case, pop. 7,742.

No. of above towns,	6
" " towns negatively reported,	13
" " doubtfully " (Needham)	1
Towns unheard from,	3
	—
	23

Proportion of towns affirmatively reported, to	
whole number of towns in County, between $\frac{1}{5}$ and $\frac{1}{4}$	
No. of cases reported from County,	8
Population of County,	109,950
Proportion of cases reported, to population	
of County, as	1 in 13,744

BRISTOL COUNTY.

The towns from which affirmative replies have been received, are: Fairhaven, 6 cases, pop. 3,118; New Bedford, 2 cases, pop. 22,300.

No of above towns,	2
" " towns negatively reported,	7

No. of towns unheard from,	11
	<hr/>
Proportion of towns affirmatively reported, to whole number of towns in County,	$\frac{1}{10}$
No. of cases reported from County,	8
Population of County,	93,794
Proportion of cases reported, to population of County, as	1 in 11,724

PLYMOUTH COUNTY.

The only town from which an affirmative reply has been received is Carver, 1 case, pop. 1,186.

No. of above	1
No. of towns negatively reported,	17
" " " unheard from,	7
	<hr/>
	25

Proportion of towns affirmatively reported, to whole number of towns in County,	$\frac{1}{25}$
No. of cases reported from County,	1
Population of County,	64,768

DUKES COUNTY.

Towns affirmatively reported,	0
" negatively "	2
" unheard from,"	2
Population of County,	4,403

NANTUCKET COUNTY.

Reply negative. Population,	6,094
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BARNSTABLE COUNTY.

The only town from which an affirmative reply has been received, is Barnstable, 2 cases, pop. 5,129.

No. of above,	1
" " towns negatively reported,	7
" " " unheard from,	5
	—
Proportion of towns affirmatively reported, to whole number of towns in the County,	$\frac{1}{13}$
No. of cases reported from County,	2
Population of County,	35,990
Proportion of cases reported, to population of County, as	1 in 17,995

SUFFOLK COUNTY.

The only town from which an affirmative reply has been received, is Boston, 43 cases, pop. 177,840.

No. of above,	1
" " towns negatively reported,	2
" " " unheard from (N.Chelsea, pop. 921),	1
	—
	4

Proportion of towns affirmatively reported, to whole number of towns in County,	$\frac{1}{4}$
No. of cases reported from County,	43
Population of County,	192,700
Proportion of cases affirmatively reported, to population of County, as	1 in 4,481

IN THE STATE OF MASSACHUSETTS,

The number of *towns* from which affirmative replies have been received previously to January 1, 1866,* including those *indirectly* reported, is 63

No. of towns negatively reported,	129
" " " doubtfully "	3
" " " unheard from,	140
	—
	335

* Brookline, in Norfolk County, is excluded because its cases occurred in 1866, while the reports from other towns came in during the previous year.

Proportion of towns affirmatively reported to whole number of towns in the State, is very nearly 19 per centum, or about	$\frac{1}{5}$
No. of cases reported from all the <i>towns</i> of the State, <i>except Brookline,*</i>	255
Population of State,	1,231,066
Proportion of cases reported (as above) to population of State, as	1 in 4,827
Population of State, 1,231,066 ; minus population of Suffolk County, 192,700	=1,038,366
Cases in the State as above, 255 ; minus 43 cases in Suffolk County	=212
Proportion of cases in the State previous to January 1, 1866, excluding those in Suffolk County, to the population of the State, excluding that of Suffolk County, about as 1 in 4,898 ($1,038,366 \div 212.$)	
Total number of cases in the <i>towns</i> of the State up to January 1, 1866,	255
Cases in Brookline, Norfolk Co., January 1, 1866,	7
Cases in Boston Harbor, Gallop's Island,	19
Fort Warren,	4
Fort Independence, etc.,	0
	285
Cases in Whitingham, Vermont,	2
Total number of cases in the tables,	287

We will state here, that besides the affirmative replies from Suffolk County, recorded in the above tables, there were 108 negative answers from that County.

* See note on page 73.

SOME GENERAL RESULTS OF THE PRECEDING STATISTICS.

THE present epidemic in Worcester County is represented by a number of the same towns in which the epidemic of 1806 to 1815 occurred. The town of Dana, where the last mentioned began in that County, had one case in 1864. Both epidemics, also, rested upon the towns of Petersham, Barre, Oakham, Hardwick, New Braintree, Brookfield, Athol, Leicester, and Worcester. "Gerry," mentioned in the account of the old epidemic, is now an obsolete name. Paxton, Rutland, Spencer, Sturbridge, and Winchendon, sufferers in the old, do not appear in the present epidemic.

Medfield, in Norfolk County, historical as the first starting point of the "old spotted fever," is represented by one case in 1865. In Cambridge, Middlesex County, the present epidemic has differed from the old, in that it has not selected the marshy portions of Cambridgeport.

It is, perhaps, worthy of mention, that Middlesex County, though in great part inland, does not seem to have suffered much in the old epidemic, and has felt the present one but lightly.

In reviewing the foregoing statistics, it strikes us that there is not a material difference between the proportion of cases to population in Suffolk County, and the proportion of cases to population in the rest of the State. As Suffolk County means Boston, and its more immediate suburbs—the latter peopled much in the same manner as itself—we learn from the above fact, that the disease in question has not sought out the metropolis especially for its ravages. On the contrary, inspection shows us that the places where the malady has dealt its heaviest blows, are the country towns of the interior of the State; as, for instance, in

Hampden County, where the ratio of cases is 1 to 735 inhabitants, while that of Suffolk County is 1 to 4,481. Or, again, contrast the ratio of Boston alone (1 to 4,136) with that of the town of Westfield, in Hampden County, which is 1 in 123; the number of cases in the city with its 177,840 inhabitants being 43, while that of the country town with its 5,055 inhabitants is 41. Another less striking instance is that of Palmer with its 20 cases among 4,082 inhabitants, or 1 in 204.

The ratio of Suffolk County, however, is much greater than that of the other eastern Counties, not diverging very widely from the ratio of the inland County of Worcester.

A survey of the statistics of the different Counties *inter se*, from west to east, gives the following results. We begin at Berkshire County, with a moderate figure--1 in 3,674, and meet a ratio in Franklin County, which as entered in the tables, was 1 in 3,929. This ratio has been raised by the reception of 5 additional cases from Montague to 1 in 2,418. In Hampshire County—next south of Franklin—the ratio rises to 1 in 1,220; and in Hampden County, next south of Hampshire, to 1 in 735. These three last-mentioned Counties form the eastern border of Berkshire. Bounding them, on the east lies the large County of Worcester, in which the ratio corresponds more nearly with that of Berkshire County, being 1 in 3,894. Passing to the east, we reach the eastern Counties, all of which touch the waters of the Atlantic at one or more points. In these, the ratio drops abruptly, being in Middlesex 1 in 14,423. Yet Middlesex is more thoroughly reported than most Counties.

In Norfolk County the ratio is not far from that of Middlesex, being 1 in 13,744. In Essex County, lying largely upon the sea, the ratio drops again to 1 in 33,122. In Bristol County, touching the ocean only on its southern border, it rises to the neighborhood of that of Norfolk, which has about an equivalent Atlantic exposure. In Plymouth County, with some three-fourths of its boundary consisting of sea-shore, the ratio drops to 1 in 64,768.

In Dukes, Nantucket, and Barnstable Counties, all well

out at sea, the replies are, for the two former, no cases ; for the last, 2 cases—or 1 in 35,990.

It happens, then, that so far as our reports inform us, the eastern Counties have had, according to their population, less of the disease than the others ; and have felt it just about in an inverse proportion to their exposure to the sea.

DOES PROXIMITY TO BODIES OF FRESH WATER FAVOR THE INVASION OF THE DISEASE ?

Glancing at the map of the State to see if any of its other features may be associated with the special prevalence of the disease, the eye falls upon the Connecticut River, to find it traversing the three Counties having the largest proportion of cases reported. We look to Westfield with its heavy list of 41 cases, and see it cut in halves by the Westfield River, near its junction with the Connecticut. We see Springfield on the opposite bank of the principal river, with its smaller proportion of 11 cases in 15,199 inhabitants ; Granby, a little further north, and about as far from the Connecticut as Westfield, showing 12 cases in 907 inhabitants ; Northampton, on the west bank of the river, having 6 cases in 6,788 inhabitants. Thence proceeding up the river, we find the towns which are reported (several are not) having single cases till we come to where the Deerfield river joins the Connecticut, much in the same manner as the Westfield river makes its junction. We observe that our reports show no such collection of cases at this spot as at the point of union of the Westfield river with the principal stream. We find at this point only four cases—three in Greenfield and one in Montague. But, while writing this paragraph, a long delayed “circular” comes in from Montague with five additional cases in that town, and containing the statement that the disease had prevailed as an epidemic in the surrounding towns.* Many of the most

* The Circular arrived too late to be inserted in the tables, but it does not materially affect their general results, except to strengthen the conclusions already drawn, that the inland Counties have been more visited by the disease than the Eastern. We shall give a report of the cases in a suitable place.

affected towns at a considerable distance from the Connecticut are watered by its tributaries. Taking these things in connection with the statements of Dr. Terry, as to the *endemic* (as we have called it) in Sutton and Millbury, in 1849, that the whole region over which it extended has "a soil very retentive of moisture, and a damp atmosphere;" while in Millbury most of the cases occurred within a few rods of the Blackstone River, which also skirts the town of Sutton; taking these things together, we have a *prima facie* case that in exposure to moisture, or proximity to bodies of fresh water, may be found one of the causes of the disease. But, let us not jump at conclusions. We have to lament that we are without full reports of the places where the disease was *not*, as well as those where it *was*. And a reliable induction upon this point cannot be made without a thorough comparison of the two classes of places.

A good illustration of the difficulty attending an investigation of this subject occurs in the circumstances of the town of Palmer. In that place, in which there were twenty cases, three rivers meet, giving the name "Three Rivers" to one of its villages. Here, then, we might be tempted to draw an inference as to the connection of the disease with emanations from the water. But, in reply to inquiries from us, Dr. Holbrook, of Palmer, writes that the part of the town "most afflicted with meningitis is very dry. The soil is of a sandy, gravelly nature, and twenty-four hours after a long or hard storm, the dust will fill the eyes." * * * "The Quaboag River is not more than a quarter of a mile from our village—an eighth of a mile would perhaps be nearer the distance. But it is quite rapid—no stagnant water—no dams within two miles of us." * * * There was, Dr. H. adds, one case in Thorndike Village, one also in Three Rivers Village; both about three miles from the district where a large majority of the cases occurred.

Of Westfield itself, also, Dr. George G. Tucker, of that place, remarks, that there is in it "no standing water or marshy ground—every thing in good sanitary condition—

even ready for the cholera. The site of Westfield is, according to geological suggestions, the bed of a former lake, six miles long and three broad. Surrounded on all sides by hills, except for a short distance on the south-east, where this body of water was supposed to have its outlet, and although its situation is low compared with its immediate surroundings, it is *not* so as compared with the level of the sea; and the air is as dry as that of the most elevated tracts."

On the other hand, Dr. Tucker says, in another place, the month of February, 1857, in which the disease broke out in Westfield, was exceeding mild, and the atmosphere for the most part filled with vapor.

PORTION OF THE STATE MOST AFFECTED NOT THAT OF THE GREATEST
“RAIN-FALL.”

One thing it is easy to determine—that is, the region most infested by the disease, so far as our reporters inform us, is not that of the greatest “Rain-Fall,” but of the second and third degrees in the descending scale.

We here take leave of the geography of the disease, and proceed to a brief notice of the

DATES OF THE CASES.

The first cases reported to us, are two in Becket, Berkshire County, in April, 1857. Another case occurred in that town in October of the same year. This was followed by five, between the 6th and 14th of March, 1858.

The disease broke out with violence in Westfield, Hampden County, in January, 1858, and prevailed there again in 1859; also from 1861 to 1865. Instances have occurred in this State, in each year, from 1857 to 1866, inclusive, with the exception of 1860, which is not mentioned in any of our reports.

It needs but a cursory survey of the tables to show that the disease, in this Commonwealth, did not follow, from year to

year, any regular course, relatively to the points of the compass, but fell upon different spots, here and there, without apparent order—sometimes retracing its steps.

The distribution of the cases in the State over the different years of the epidemic is as follows, viz. :

In 1857 there were	3 cases.
" 1858 " "	27 "
" 1859 " "	3 "
" 1860 " "	0 "
" 1861 " "	5 "
" 1862 " "	5 "
" 1863 " "	7 "
" 1864 " "	88 "
" 1865 " "	116 "
It was also stated that "from 1864 to 1865" there were	15 "
" from 1861 to 1865" there were	8 "
The years were not mentioned as to	3 "
	—
	280 "

As we have, of course, no full accounts for the present year, the cases in Brookline, in January, 1866, are not to be counted in. They amounted to	7 "
	—
	287 "

The months in which the cases occurred are given as follows, viz. :

January,	21 cases.	July,	8 cases.
February,	25 "	August,	4 "
March,	37 "	September,	4 "
April,	30 "	October,	5 "
May,	14 "	November,	2 "
June,	5 "	December,	8 "
		—	
		163	"

January to April,	18 cases.
February to May,	6 "
February to April,	20 "
February to March,	9 "
March and April,	2 "
" Winter and Spring,"	8 "
February to July,	4 "
" July or August,"	1 "
November to December,	5 "
	—
	236 "
Not mentioned,	51 "
	—
	287 "

Now, if we take the first of the above lists—that in which the number of cases is specified for each month separately—we find that the number of cases set down to the first *five* months of the year amounts in the aggregate to 127; while those which occurred in the remaining *seven* months number only 36. May has a much lower number than either of the preceding four months.

In the second list, also, the cases representing exclusively the first five months amount to 55; while those stated as occurring in "July or August," and in November and December, number only 6.

November and December, it will be noticed, though averaging as great an amount of cold weather as any of the other months, are among those with small representation of cases.

But, the months mentioned as giving the bulk of the cases are those in which there is much alternate freezing and thawing; and consequently much *cold combined with moisture*.

METEOROLOGY.

As to the meteorology of the past nine years, which cover the period of the present epidemic in this State, we are not aware of any thing unusual to be recorded of it. On the contrary there has been, as to the weather, the *ordinary diversity*, from year to year, characteristic of this climate.

SOURCES OF THE DISEASE.

The *sources* to which the disease is ascribed by our correspondents are—

Probable or possible contagion, in cases	16
Variously otherwise specified in the tables, in cases	75
“ Not known,” in cases	152
Not mentioned, “ ”	44
	—
	287

LOCALITY—HIGH OR LOW, DAMP OR DRY.

The *locality* of the disease, as to *level*,

was not mentioned in	37 cases.
Not definitely stated in	7 “
Medium in	1 “ 45
No preference for high or low was shown in	143 “
The locality was high in	58 “
“ “ “ low in	41 “
	—
	242 “ 242
	—
	287

The *dryness* or *dampness* of the “locality” of
the disease was *not mentioned* in 52 cases.
leaving 235 cases.

Of these there was said to be *no pre-*

ference in	147 cases.
The locality was <i>dry</i> in	60 “
“ “ “ <i>damp</i> in	28 “
	—
	235 “ 235 “
	—
	287 “

OCCURRENCE OF THE CASES IN DISTRICTS THICKLY OR SPARSELY SETTLED.

The term "thickly settled" varies its meaning so much under different circumstances—particularly as between the city and the country—that we have divided our cases under the above caption into three divisions—the first composed of those among the military on the Islands in Boston harbor, numbering

23

The second embracing those in the City of Boston
(including South Boston),

=43

The third, taking in all in the remainder of the State, =221

287

In *Boston harbor* there were 19 cases at Gallop's Island—"over-crowded;" 4 at Fort Warren, which went from Gallop's Island, and were, while at Fort Warren, "as usual in military quarters," i. e. *crowded*; in all

23

In *Boston*, there were, in a district "not very thickly settled" (in South Boston), cases 3

(In City Hospital,) ditto, "sparsely," " 5

" " medium," " 1

" " not crowded," " 16

" " thickly," " 7

" " crowded," " 1

Settlement of district not mentioned, " 10

43

In comparing these 43 cases *inter se*, we exclude those whose localities are "not mentioned" (10); and also, as bearing on neither side, the case (1) designated as occupying a "medium" locality, together with 3 in a part of South Boston "not very thickly settled"; making in all, 14; and leaving (of the 43) 29 to be reckoned upon. Of these 29, their locality is given as

" Sparsely" settled in 5

" Not crowded," i. e., the better class of city streets, 16

21

Against these 21 cases we set off, as in "thickly" settled districts, 7, "crowded," 1=8. This gives us between two and three times as many cases in the less thickly settled parts of the City of Boston, as there were in the thickly settled or crowded portions (21 to 8).

On the *main land outside of Suffolk County*, the cases are 221 in number, and are classified as follows, viz.:

Cases in which settlement of locality is not mentioned,	10
Cases indefinitely described,	1
Do. "medium,"	6
Case in "Dorchester,"	<u>1—18</u>
Excluding the above 18, we have left 203; of these there was as to locality "no preference" in cases	99
There were in places "thickly" settled,	26
" " " " "rather thickly settled for country town,"	3
" " " " "sparsely" settled,	74
" " " a "village,"	<u>1—203</u>
	<u>221</u>

Of the above 203 cases, 99, or nearly one-half, showed "no preference" in their choice of locality whether "thickly" or "sparsely" settled. Of the remaining 104 cases, 26 were in places set down as "thickly" settled; and 3 in a place "rather thickly settled for a country town," =29 cases. Against these we set off 74 cases in a "sparsely" settled region, and 1 in a "village" =75.

Thus we have between two and three times as many cases in the "sparsely" settled as in the "thickly" settled localities. This result tallies closely with that in Boston.

Now taking our three divisions of the State together, we have in Boston harbor,

In "over-crowded" barracks,	cases 19
In ordinary military quarters,	" 4—23

In thickly settled quarters of Boston (no other towns of Suffolk Co. being affected)	"	8
On the main-land, outside of Suffolk Co., in more or less thickly settled localities,	"	29
		—
		60

In the less thickly settled parts of Boston,	"	21
In the less thickly settled regions of the remainder of the State,	"	75—96

We thus get a majority of 36, out of 96 cases throughout the State, in favor of the less thickly settled regions.

To confront the question of the distribution of the cases from another point of view—that is, as between the Metropolis and the rest of the State—we have only to repeat, what we have already deduced from previous statistics, that there is not a material difference between the proportion of cases to population in Suffolk County, and the proportion of cases to population in the remainder of the Commonwealth.

These facts bear, as will be hereafter seen, upon the pathology of the disease.

CONDITION OF PATIENTS.

In asking the questions, "How many were in easy or comfortable circumstances?" and "How many were poor?" we include in the former category all who were not subjected to privation. These questions were not answered as to

cases 34

Leaving 253.		
There were in the Almshouse at Monson,	"	2
At the Boston City Hospital,	"	5
Soldiers in Barracks,	"	23
In easy or comfortable circumstances,	"	89
Poor,	"	26
There was "no preference" in	"	108—253
		—

287

In recording the *ages* of the cases, we have, acting by advice, made an arbitrary division of them; as follows, viz.:—

Under 15 years, we call "Infancy or Childhood;" from 15 to 20, "Adolescence;" from 20 to 50 "Middle age;" from 50 upwards, "Advanced age."

AGES.

In taking account of the ages, we exclude cases in which the age is <i>not mentioned</i> ,	4
Also cases in which the age is <i>not definitely mentioned</i> ,	5
Cases stated to be "about half of them children and half adults,"	18
* <i>Soldiers</i> of middle age,	9
" in adolescence	14—50
This leaves us 237 cases, out of which we have, as <i>explicitly reported</i> ,	
In "Infancy or Childhood,"	79
In Adolescence,	12
Adults,	67—158
showing a preponderance of 24 cases in the two earlier periods of life over those of adult life. This preponderance is strengthened by the following statement, viz.:—	
There were "chiefly children" in cases	44
Of a group consisting of children and youths there were "chiefly children." The group consisted of	4
There were "young lads mostly" in cases	16—64
There were chiefly "adults" in "	15—237
	287
It remains to say that of the adults numbering (still exclusive of the soldiers) 67,	
The exact age was not mentioned in	cases 17
The age was "advanced" in	" 4
The patients were of "middle age" in	" 38

* Soldiers are excluded as being of *selected* age.

The subjects were chiefly of "middle age" in cases 8—67

Among the "greatest ages" we find one subject to have been of 72 years—another of 65 years; among the earliest ages, two of four months each, and one of five months. No period of life was exempt.

SEX.

The sex was not mentioned in		cases 29
The subjects were soldiers in barracks in	"	23
		52
We therefore exclude [cases		52
The male sex was represented in	"	131
" female " " " "	"	88
This gives us a preponderance of nearly 60		
per centum of males over females.		
This preponderance is increased by a group		
of 16 cases "mostly lads,"		16
		287

"SPORADIC OR EPIDEMIC."

There was no entry under this heading in cases	32	
The replies were "doubtful" in	" 13	—45
The term "Sporadic" was applied to	" 131	
" " "Epidemic" " " "	" 111	—242
		287

Although the larger number of the cases competent to be reckoned upon were considered by their reporters as sporadic, we presume the whole 287, taken together as for the State, may be regarded as constituting an *epidemic*.

CONTAGION.

The question "were there evidences of conta-		
gion?" was not answered in		cases 19
leaving 268 cases to be reckoned.		

It was answered affirmatively three times,	
i. e., by one reporter as to	cases 5
by another as to	" 1
by a third as to	" 4—10

There were coincidences pointing to contagion
in three other reports, together comprising
cases numbering 6

Thus out of 268 cases in which the point was
mentioned, the answers were negative as to 252—268

287

In relation to the 16 cases above-mentioned as more or less suggestive of contagion, we proceed to show the evidence.

Two of the "doubtful" cases are in the report of Dr. Page concerning the epidemic at Gallop's Island. One of them was that of a physician who attended a case of "Spotted Fever" previously to going to the Island. The other was that of a recruit who occupied the bed previously used by another patient who had had the disease. No comments were made by Dr. Page upon these facts; and we give the evidence as it stands.

Dr. Seavers answers affirmatively to the question of contagion as to the 4 cases at Fort Warren; saying they "all occurred in the same barrack, and all came from a place [Gallop's Island] where there had been cases previously."

In 2 cases the reporter of them gives it as his opinion that the disease was contagious from what he had seen of it previously, but does not appear in his letter to show evidence for it in these particular cases.

In two other cases the reporter answers negatively to the question whether or not there were evidences of contagion, but adds, "it would seem as though the children took it [the disease] from the father, or the same cause operated to produce it in all three."

In six cases in Northampton, Dr. Thompson thinks five were all "causatively connected by contagion" with the first case—a stranger who imported the disease. There were, he says, "six cases in two families—locations apart and dif-

ferent. The first patient in the second house had had contact with the first in the other (i. e., the stranger woman) at a manufactory, away from either dwelling. In one of the houses three families lived separately. Three cases in one of the three families—no one else sick under that roof."

The remaining case answered in the affirmative was one where the patient—a physician—had visited a case of the same affection two weeks previously. (Vide cases of Dr. David Rice.)

We have presented the evidence as to these cases of contagion alleged or suggested. The writer, speaking for himself alone, sees in most of them, coincidences, but is not satisfied that the "causative connection" is proved in any of them. The four cases in soldiers who went from Gallop's Island to Fort Warren, we would submit, may have gone with the seeds of the disease in them. And it is to be noted that they did not communicate it to others in the garrison.

DURATION.

As to the duration of the disease our tables give us comparatively few cases in which it is specified for each case; and so great is the diversity in the length of the cases (taking the deaths with the recoveries) that a general average would throw little light on the behavior of the disease in this respect. We have, however, drawn off the durations of the single fatal cases, and single cases of recovery; and also, the "average durations" of the groups of cases which were all fatal; and, separately, those of the groups which all terminated in recovery, as follows, viz. :—

Fatal Cases—Duration.

Average duration.	Cases.	Average duration.	Cases.	Average duration.	Cases.
Less than 3 days	8	12 months	1	2½ months	1
5 days	1	24 hours	1	Relapse?	1
36 hours	1	12 days	1	4 days	1
about 4 days	7	4 days	1	23 days	1
25 hours	2	42 hours	1	4 weeks	2
39 hours	5	3 days	1	30 hours	1
31 hours	1	48 hours	3	36 hours	1
about 18 days	4	3 days	1	14 days	1
2 days	2	13 days	3	23 days	1
6 weeks	1	2½ days	1	11 days	4
3½ days	1	Less than 24 hours	1	a few hours	2
36 hours	2	about 1 week	1		—
about 5 days	2	5 days	1		15
10 days	2	4 weeks	1		—
	—	43 hours	1		22
	39	4 days	1		—
		10 days	1		22
		4 days	1		39
			—		—
			22		76

Fatal cases at Gallop's Island, deduced from published report.

Duration.	Cases.	Duration.	Cases.
5 days	1	2 days	1
2 days	1	19 days	1
2 days	1	8 days	1
30 minutes	1	18 days	1
1 day	1	2 days	1
2 days	1	12 hours	1
14 hours	1	4 days	1
1 day	1	3 days	1
	—		—
	8		8 = 16
			—
			92

Additional fatal cases obtained from inspection of the Circulars, and not distinguishable in the tables.

30 days,	1 case	1
"a few hours,"	1 case	1
4 days,	1 case	1
		—
Fatal cases, total = 95		

We have, in the above lists, 66 cases in which the result was fatal, and in which the duration, or the average duration, was 5 days or *under*; 1 fatal case of 8 days duration; and 28 fatal cases, the duration, or the average duration of which, was 10 days or *over*.

Of the "12 months" fatal case in the preceding list (Dr. Faulkner's), the reporter says—"the patient died in one year, after months of activity, but not of recovery." This is the longest *fatal* case we have as yet met with. Our list also contains the shortest case we have seen on record, whether among fatal cases, or recoveries—30 minutes from the acute attack. The patient, however, had vomited, a few hours previously, from, as it was supposed, an overloaded stomach.

Cases of Recovery—Duration.

Average duration.	Cases.	Average duration.	Cases.
3 weeks	4	10 days	4
2 weeks	1	54 days	1
3 weeks	6	7 weeks	1
2 weeks	1	"Say" 4 weeks	4
4 weeks	2	"Many months"	1
		31 days	1
8 hours	1	4½ months	1
45 days	1	5 months	1
2 months	3	8 weeks	1
8 weeks to convalescence, 1 year to full health	1		15
About 7 weeks	2	3 weeks+	1
	—	11 weeks+	1
	22	26 days+	1
			From Gallop's Island.
			18

Additional cases of recovery obtained from inspection of the Circulars, and not distinguishable in the tables.

Average duration.	Cases.	Average duration.	Cases.
1 week	1	3 weeks, acute stage,	3
3 weeks	1	recovery protracted further,	
	—		3
	2		

$$2+3=5 \text{ cases.}$$

Duration discriminated in		
Cases of recovery	22+18+5=	Total, 45
Fatal cases (bro't over from p. 90)	"	95
Cases in which the duration was not discriminated } for fatal cases and those of recovery,		147
		287

The eight hours case in the list of recoveries was 8 hours *under the acute attack*; after which, we are told, the convalescence was rapid. It was interesting as having been treated after the manner of sun-stroke in India; and in being as exceptional in its brevity *for a case of recovery*, as the twelve months *fatal* case was for its length.

In the vast majority of the cases of *recovery* given above, the duration of them may be stated in weeks and months; while in a large majority, more than 2 to 1, of the fatal cases, the duration was of days or hours.

In some of the statements the average duration was given as approximative; but, in all, we presume with sufficient accuracy for practical purposes.

RELAPSES.

Besides the case of relapse of Dr. Faulkner, fatal at the end of a year; there were among the cases of Dr. Holland, of Westfield, 5 relapses, three of which were fatal. There were relapses also in both the cases, fatal, of Dr. Cabot, of Boston; in three (which recovered) of Dr. Borland's cases at the City Hospital in Boston; in some or all of the cases of Dr. Seaverns, at Fort Warren, all of which were fatal.

Since no question was put, in the circulars, as to relapses, that event may have occurred in others of the cases in the tables without our being cognizant of it.

CONVULSIONS

were not mentioned in cases	36
leaving 251 cases to be accounted for.	
Of these the symptom was absent in cases	123
" " " " was not frequent in cases	7
	—
	130
It was present in	72
There was much convulsive action in	4
" Spasmodic action " was frequent in	16
Convulsions were "a frequent occurrence"	18
There were ditto in "most" of a group of	9
" " cramps in the arms and hands in	1
Hands clenched in	1—251
	—
	287

We may estimate that convulsive action, in one form or another, was present in considerably less than half the cases in which the symptom was mentioned.

HEADACHE

was not mentioned, or	} in cases 25
was not ascertained—as where patients were unconscious,	
" " " as where patients were too young,	
This leaves 262 cases to be accounted for.	
Of these it was <i>present</i>	in cases 191
" " " " "frequent"	" " 16
It was present "in every case in which the sufferer could describe his sensations," in groups consisting of	" 24
Present "in all fully developed cases," of a group of	19
	—
	250
It was <i>absent</i> in cases	3

" Several complained of severe headache, others but little," in a group composed of cases	9—262
	— 287

Thus, we may say headache was present in a vast majority of the cases in which the symptom was mentioned, or its presence or absence could be ascertained. In the three cases in which it was stated that it was absent, we are left in the dark as to the circumstances—whether, for instance, the patient were conscious or not. In no *fully developed case* are we distinctly told that the patient was conscious of sensation, and yet free from pain in the head.

When the degree of the headache is mentioned, it is sometimes said to be mild; more often severe; by one observer, "*terrible*"; by another, "*excruciating*".

In 19 cases the part of the head affected was mentioned. In 10 the pain was in the back part of the head; in 3, in the "back part especially." In 6 cases the pain was in the front part.

In 7 cases it was mentioned that pain extended from the head, more or less down the spine. Of 17 other cases, this occurred in every one where the sufferer could speak. The record does not show that this extension did not take place in other instances.

DELIRIUM

was not mentioned in	cases 12
" perhaps masked by coma in	" 3
The patients were unconscious in	" 4
" " " too young to manifest it in	" 4
	—
	23

This leaves 264 to be accounted for.

The symptom was present in	cases 165
" " " present in "nearly all" of "	24
" " " generally present in "	16

The symptom was present in "nearly all not relieved in 24 hours" in	"	14
Present "in all the fully developed cases" in a group of	"	18
	—	237
Delirium was <i>absent</i> in	"	26
" " not marked in	"	1—264
	—	287

Thus, in a very large majority of the 264 cases to be reckoned upon, delirium was present. The *character* of the delirium was variously described as—mild; violent; low muttering, &c.

Of 165 cases in which it was stated, without qualification, that delirium was present, the question as to *logical answers* was not mentioned in cases

23

Logical answers were given in	cases	104
" " " " generally given in "	"	17
" " " " not given in	"	21—142
	—	165

It results, therefore, that in a very large majority of the cases, 165 in number, in all of which it was stated that delirium was present, and in which our reporters replied to the question as to logical answers, the delirious could be roused to give such answers.

Also, of the cases which will be found numbering 72 on pages 94 and 95, in which delirium was said to be more or less *generally* present, the delirious could, in a majority, be roused to give logical answers.

OPISTHOTONOS

was not mentioned in	cases	23
Replaced by emprosthotonos in	"	1
Doubtful in	"	2
	—	26

leaving 261 cases to be accounted for.

There was <i>severe</i> opisthotonos in	cases 107
" " slight " in	" 80
	—
	187
There was opisthotonos "in nearly all" of a group of cases amounting to	9
There was opisthotonos "in about two- thirds" of a group of cases numbering	17
	—
	213
<i>Absent</i> in cases	48—261
	—
	287

TENDERNESS AT NUCHA

was not mentioned, not observed, or not recorded, in	cases 75
was not ascertainable in	" 1
The patients were unconscious in	" 3
	—
	79

leaving 208 cases to be accounted for.

The symptom was present in	cases 121
do. "in nearly all" of	" 15
"Probably in all" of	" 19
	—
	155
There was great soreness and stiffness in	" 1
In all who could describe in	" 7
Replaced by <i>pain</i> on motion in	" 2
" " " between shoulders in	" 1
" " " pain "	" 2
<i>Absent</i>	" 33
"Not marked"	" 7—208
	—
	287

It may be estimated that *tenderness at nucha* was present in about three-fourths—or at least in more than two-thirds—

of the 208 cases competent to be reckoned upon. Perhaps if attention had been drawn to the symptom we should have had reason to rate it as still more frequent.

PULMONARY OR PLEURAL SYMPTOMS.

Among these we include, those slight and severe, sympathetic or otherwise. (Vide tables.)

They were not mentioned, or not observed, in cases 71 leaving 216 cases to be accounted for.

Present in		cases	59
" " "most" of a group of		"	17
Hurried respiration "generally" pre- sent in a group of		" "	9
Respiration abnormal in about half of a group of		"	19
Above symptoms present "in some" of a group of		"	16
Above symptoms "not mentioned" of a group of		"	7
Above symptoms absent		"	89—216
			—
			287

N. B.—Among the so-called pulmonary symptoms, *difficult respiration*, as simply a functional disturbance, figures largely. (See tables.)

ABNORMAL CONDITIONS OF THE HEART, INCLUDING THOSE OF THE PULSE.

For descriptions of the above, we refer to the tables. The figures below relate almost entirely to the *pulse*.

Abnormal conditions are set down by us as indefinitely described, not recorded, or not mentioned, in cases 50 This leaves 237 cases to be accounted for.

Abnormal conditions were present in cases 174
" " were generally present in " 19

The pulse was generally frequent in	cases	7
" " " variously affected in	"	18
No "well-marked" abnormal condition of heart or pulse in	"	16
The pulse was "not particularly quick" in	"	2
" " " "not much disturbed" in	"	1
	—	237
	—	287

It may be seen, by inspection of the tables, that there was no one departure from the normal standard of the pulse generally characteristic of the cases. It was occasionally retarded; sometimes variable; often accelerated. In some instances, again, it was not much affected.

ABDOMINAL SYMPTOMS.

As it does not clearly appear in most of the circulars whether abdominal symptoms, when not recorded, were absent or mention of them omitted (owing to a misprint in the circulars), we give no summary of results; but refer to the tables for descriptions of such as are alluded to. *Nausea* and *vomiting* are not unfrequently spoken of.

Abdominal symptoms have generally no prominent place, either in the accounts which have come down to us of the epidemic of 1806 to '15, or in the published reports of later visitations of the disease.

PETECHIE OR OTHER MORBID APPEARANCES OF THE SKIN.

The descriptions we have received of the above are given in a condensed form in the tables.

Morbid appearances of the skin were not mentioned in	cases	29
Were not looked for in	"	7
Were not recorded in (hospital cases)	"	2
	—	38

leaving 249 cases to be accounted for.

They were present in	cases	129
They were very general in	"	19
Peculiar condition of the skin, in some cases without spots, of a group* of	"	11
They were "not marked" in	"	6
They were not present in	"	84
	—	249
	—	287

We may say, then, that petechiæ, or analogous spots, were present to a marked degree, in somewhat less than 59 per centum — of 249 cases competent to be reckoned upon. It is easy to see, on inspection of the tables, that *petechiæ* and *opisthotonus* were often combined in the same individual.

THE TERMINATION

was not stated in	cases	9
leaving 278 cases to be accounted for.		
The termination was <i>fatal</i> in	cases	170
<i>Recovery</i> took place in	"	108
	—	278
	—	287

The percentage of *fatal* cases in the 278 cases to be reckoned upon was a little over 61. The percentage of *recoveries* was a little less than 39.

AUTOPSIES, TREATMENT, REMARKS.

Where there has not been room for either of the above in the tables, we give them here, designating the cases to which they belong by numbers corresponding with those under one or more of the above captions in the tables.

* Vide tables. Cases of Dr. Orcutt, Worcester Co.

I. Dr. E. G. WHEELER, Becket. No autopsies.

Treatment. In two cases Dr. W. took blood freely from the arm in the commencement, and in all cases followed up the antiphlogistic plan, whenever arterial action seemed to call for, or even allow of it; aided by counter-irritants along the course of the spine. For internal remedies he depended chiefly upon sulph. quinine and opium, and generally gave them in combination.

Remarks. In one patient, æt. 45 years, Irish, a respectable laborer, the symptoms yielded very readily to prompt antiphlogistic treatment — venesection, cupping and counter-irritants over the spinal cord, and internally quinine and opium. Subsequently, on the second day from the attack, he was able to sit up, and when left alone went down stairs, and some four or six rods to the spring through thawing snow, having only thin shoes on. Immediately upon his return to his chamber, he was taken with a severe chill; skin became cold and blue, no reaction came on, and he died in a few hours. * * *

II. Dr. WILLIAM W. GREENE, Pittsfield.

Autopsies in three cases. Brain much engorged. Base and spinal cord covered with a yellowish green, illy organized exudation, which sometimes lined the ventricles, and covered posterior part of cerebellum.

Treatment. Cathartics, anodynes to relieve pain, large doses of quinine and stimulants, decided counter-irritation at nucha. In one, venesection.

Remarks. The exudation resembled very much that of diphtheria. One man was violently attacked with cerebro-spinal symptoms and abundant spots, lasting for two days, when an abundant exudation occurred in the throat, and all the pain, delirium, opisthotonus, tenderness, &c. disappeared.

III. Dr. DAVID RICE, Leverett, &c.

Treatment. Blisters the sheet anchor, applied successively to the spine nearly its whole length; mild cathartics;

during convalescence, stimulants and tonics; frictions with tincture of cayenne and alcohol; mild anodynes; cupping.

IV. Dr. D. BRADFORD, Montague.

Treatment. Anodynes, stimulants, and aperients. Sudorifics at first, with bottles of hot water externally and sinapisms. Opium and stimulants were given freely on last days of sickness.

V. Dr. C. TEMPLE, Heath, &c.

Treatment. Opium in the early stages; later, quinine, or protoxide of iron with Peruvian bark.

Remarks. The patient, aged 11 years, who was sick sixty days, did not speak or move a limb, except the left foot, at any time from the 6th to the 36th day, then gradually recovered.

VI. Dr. JAMES HOLLAND, Westfield.

Autopsies. Morbid appearances were confined to the membranes at the base of the brain and in spinal column. Color of dura mater was darker. Patches of coagulable lymph of greenish color were found scattered between the arachnoid and pia mater at base of brain. Spinal cord invested completely by thin lymph. Turbid serum was found in every case, and, in some, pus and small clots of blood. Caries of two of the lumbar vertebrae, at the point of exit of the spinal nerves, was found in one case. Paralysis of the lower limbs attended this case for five weeks previous to death. *Induration* of the spinal cord was found in every case. *Softening* of the medullary substance of the brain or cord was *not discovered* in any case, save the one in which caries of the lumbar vertebrae existed, and that only at the point where the bone was diseased. At this point pus was found, a portion of which had passed out along with the spinal nerves into the adjacent muscles.

Treatment. No mode of treatment adopted was satisfactory. The application of large numbers of leeches to the

occiput and neck, keeping up the bleeding for a length of time by means of warm fomentations, gave relief for one or more days in every case where made. Cupping did not answer as well as leeching. Strong mustard poultices, frequently renewed, to the whole length of spine, gave great relief to pain. Blistering largely with emp. lyttæ also afforded the same temporary relief. Calomel purges in the very first stage, were in every case administered, and small doses repeated several times daily until the gums were touched, without permanent benefit. Opium in various forms, hyoscyamus and belladonna were given with good effect in allaying pain—but never in large doses. Fluid ext. veratrum viride, in doses from three to five drops, afforded marked relief, abating the throbbing pain in every case in which it was given. It was given every two or three hours during the paroxysms of pain, which usually returned in the night time. As an arterial sedative, it far excelled every other remedy I used in treatment of this disease.

Remarks. Rigid contraction of the muscles of the spine was a marked feature in every case in 1858—especially was this noticed in the muscles of the neck in every case. Two children, one eleven and the other thirty months old, were unable to swallow anything for a period of about eight days previous to their death, so violently and rigidly were their heads drawn back. They died on the eleventh day of the disease.

VII. Dr. W. M. TROW, Williamsburg.

Remarks. There was soreness of the throat, slight. There was nothing to indicate immediate death till a few moments before the patient expired.

VIII. Dr. A. W. THOMPSON, Northampton.

Treatment. Supporting and stimulating, with various devices from day to day, according to the indications.

Remarks. In one case the tenderness at nucha, which was marked, was followed by utter loss of power of the muscles which move the neck.

IX. Dr. L. E. MARSH, Granby, &c.

Treatment. Antiphlogistic and sedative at the commencement—afterwards stimulant and tonic.

Remarks. In several cases congestion of the lungs complicated the disease. In three of the cases paralysis supervened, and those proved fatal. In one case *pleuero-pneumonia* set in and carried off the patient, a woman of 45.

Dr. M. considers the disease of the same nature as diphtheria. *In one case—a girl of 15—there was complication with diphtheria.* The patient recovered and was well the August following her attack (which was in March), excepting in point of strength.

X. Dr. J. W. GOODDELL, Greenwich.

Treatment. Tonics, stimulants, and nourishment “of the strongest kind;” also powerful counter-irritants the whole length of the spine, particularly at nucha. Blisters, iodine, chloroform, ammonia, cupping, &c. &c. To one boy, 13 years old, Dr. G. gave almost a *pint* of whiskey in two hours, with no perceptible effect.

Remarks. The “locality” was a sandy plain, with a pond one mile distant, both east and west. Beyond are the hills of Hardwick on the east, and those of Prescott on the west.

In the month following these cases, says Dr. Goodell, “*we had some 30 cases of severe typhoid pneumonia—many commencing with all the symptoms of meningitis.*” Some of these cases were left in a very prostrate condition; one was followed by paralysis of right arm. All of them recovered except two, who were over seventy-five years of age.

XI. Dr. GEORGE G. TUCKER, Westfield.

Autopsies. Dr. T. made 8 autopsies. He found the cerebral substance not morbidly affected. Patches of lymph

were almost always seen distributed over the surface of the pia mater with some opacity of the membrane ; and also collections of fluid lymph of variable quantity, extending sometimes the whole length of the spinal cord and completely surrounding it. The cord itself was very perceptibly changed in many cases—softening in different degrees—some sections being of about the consistence of cream. Membranes somewhat injected.

The *treatment* consisted in powerful counter-irritants applied over the spine—sinapisms, blisters, setons and the actual cautery ; an efficient cathartic at the commencement, with alteratives in the form of mercurial preparations, and permanganate of potash. Opium was always used freely when the brain tolerated it. Inhalations of sulphuric ether were frequently given, with much temporary relief. In the more prolonged cases, assuming an adynamic condition—iron, quinine, strychnine, electricity, alcoholic stimulants. Some cases put on a “typhous” aspect at the commencement, which required general treatment of a tonic and stimulating character.

Remarks. *The mode of invasion varied considerably in different cases. In some there were the usual symptoms of febrile disturbance ; chills, rigors, pain in limbs, head, &c., with occasional vomiting, diarrhœa, or costiveness ; the neck gradually becoming stiff, followed by opisthotonus more or less complete.* * * * *In other cases there were no formative periods or premonitory symptoms, the patient being suddenly insensible and convulsed, with the rapid formation of opisthotonus, which in five or six cases was very perfect.* * * * The character of the delirium varied in some respects. In the cases attacked suddenly it was impossible to arouse them, or arrest attention in the slightest degree. In cases not suddenly attacked, the patient would at times fix the mind upon questions asked, long enough to give intelligent answers. Some degree of bronchial irritation and pulmonary congestion were present in some cases, though never sufficient to be a complication of much importance. * * *

XII. Dr. J. ABBOTT, Westfield.

Says the remedies which seemed to do the most good were Bryonin and Rhus toxicodendron—the strong tinctures.

XIII. Dr. WILLIAM G. BRECK, Springfield, &c.

Autopsies showed, in cases in which death occurred early, inflammation of membranes of brain and spine; in those which died later there were purulent deposits. There were, however, traces of pus in some rapid cases.

The *treatment* was by counter-irritants of the most active character. Sedatives, alteratives, and in some cases opiates, acted well. In some cases, also, large doses of hydrargyri submurias seemed to have good effect. Oil of turpentine and veratrum viride were given.

Remarks. The cases that did the best were those in which the occiput and the whole spine were early vesicated—calomel in large doses being given *early*.

XIV. Dr. M. CALKINS, Springfield.

Treatment. Tr. aconite, cold water to the back of the head and the spine, hot pediluvia, copious draughts of tepid water.

XV. Dr. WILLIAM HOLBROOK, Palmer, &c.

Treatment. A variety of treatment was tried: stimulants, tonics, cupping, blistering, &c. &c.; opium, calomel, veratrum viride, &c. &c.

XVI. Dr. SAMUEL SHAW.

Treatment. Aconite and belladonna—applications of cold water to the affected part. In the first case he saw, Dr. S. applied mustard paste, but found it to aggravate the difficulty. He then adopted cold water as an application, with better results.

XVII. Dr. J. P. LYNDE, Athol.

Autopsy. Dr. L. examined the spinal cord in one case, and found it coated over with a thick, greyish white *albuminous*,

or, some would say, *fibrinous* exudation, slightly adherent to the membranes. Brain not allowed to be examined.

XVIII. Dr. F. A. Wood, Petersham.

Treatment. In 3 cases which died, Dr. W. gave whiskey, anodynes, and tonics. In one which recovered, he purged with calomel, blistered the base of the skull, and cupped the temples till faintness took place.

XIX. Dr. A. A. ORCUTT, Hardwick, &c.

Treatment. Hot baths, and cloths wet with very hot water to the nucha; tonics and stimulants.

XX. Dr. S. P. MARTIN, New Braintree, &c.

Treatment. Warm baths, hot applications to spine, counter-irritants, cupping, occasional cathartics, anodynes, tonics, stimulants.

XXI. Dr. E. M. WHEELER, Spencer.

Treatment. The first case got a brisk emetic and a cathartic. The other had spontaneous vomiting and diarrhoea. They both received anodynes, morphine and chloroform, hot stupes of dilute alcohol, occasional laxatives — followed by tonics.

Remarks. In the last case mustard was attempted to be applied to the spine previously to Dr. W.'s arrival, but was followed by appearances of approaching convulsions, and was removed. Both patients had numbness of the arms and legs; and one had ostitis of one knee, which lasted some months.

XXII. Dr. J. T. Rood, Brookfield.

Treatment. About twenty minutes after the patient first complained of being ill, she had a convulsion. Soon after this Dr. R. saw her and found no perceptible pulse. He gave whiskey *very freely*, and as soon as the pulse rallied, immersed her in a warm bath; then stimulated freely again, and put a strong sinapism about six inches wide the whole length

of the spine—applied heat to the feet and cold to the head. In ten hours from first attack the patient went to sleep, and from that time her convalescence was rapid. This is the case alluded to before as one of sudden invasion, treated after the manner of sunstroke in India.

XXIII. Dr. G. D. COLONY, Fitchburg, &c.

Autopsy. There was no post-mortem in either of Dr. C.'s cases. But he mentions that at the autopsy of a patient of a neighboring physician in Westminster, the surface of the brain and the spinal cord, "beneath the arachnoid and investment," was covered with a yellowish half-organized deposit, quite abundant in many places.

XXIV. Dr. BENJAMIN F. HEYWOOD, Worcester.

Treatment. Dry cups to back and sides of neck, sinapisms, opiates, diffusible stimulants.

XXV. Dr. O. MARTIN, Worcester, &c.

Treatment. Free purgation to begin with. Blisters to neck and spine. Opiates to procure sleep. After a few days, stimulants and nutriments. The bowels were kept open without purging.

Remarks. Dr. M. says one of the cases was left very feeble, also deaf. He was subsequently drowned in less than four feet of water—falling, as was supposed, in a convulsion generated from the old disease.

XXVI. Dr. C. C. FIELD, Leominster.

Treatment. Alteratives and laxatives, blisters, low diet.

XXVII. Dr. C. A. WILCOX, Upton.

Treatment. Calomel, opium and camphor, cathartics, frictions, with stimulating agents along the spine.

XXVIII. Dr. C. W. BARNES, Marlboro'.

Remarks. In the case showing no convulsions, there was constant jactitation. No. 1 was attacked soon after recovery

from scarlet fever; No. 2, immediately after coasting on a very cold night.

XXIX. Dr. F. BUNDY, Billerica.

Treatment. The first case did not recover "from the congestive stage." Stimulants and mustard were used freely. In the second case, morphia to control pain, cold to the head; also showering, beef tea, veratrum viride, cathartics and injections.

XXX. Dr. C. JORDAN, South Reading.

Treatment. In two, depletion with counter-irritation to the spinal column and extremities. Both fatal. Third case, counter-irritation and tr. ferri murias. Recovered.

XXXI. Dr. J. ALLEN, Boxford, &c.

Treatment. Permanganate of potassa was given to the child that recovered. Was attended with a copious secretion of urine.

XXXII. Dr. S. SALISBURY, Brookline.

Treatment. In the older patients cathartics at first, then antispasmodics; in the younger, expectant treatment.

Remarks. In the recoveries, convalescence was very slow. All the patients slept in apartments small, in proportion to the number of occupants, and made as close as possible.

XXXIII. Dr. J. S. GREENE, Dorchester.

Treatment. A cathartic at the outset, enemata subsequently; opiates; aconite or veratrum viride *pro re nata*; permanganate of potash; quinine in early convalescence, turpentine later; whiskey was not well borne. Beef juice was given freely during the acute stage. Cold to the head was used, and counter-irritation assiduously.

XXXIV. Dr. C. E. WARE, Boston.

Treatment. Supporting, with moderate doses of quinine, was the course with all the successful cases. Dr. W. lost

none after he followed it persistently. He thought a very free use of stimulants, especially early, decidedly mischievous.

Remarks. In several of these cases diphtheria unequivocally existed. In one family where there were four cases, unquestionably all of the same disease, the petechial eruption and the diphtheritic condition of the throat existed in some, but not in all.

XXXV. Dr. L. R. SHELDON, Boston.

Treatment. Ice to the head and back of the neck; veratrum viride; frequent sponging of the surface. Dr. S. has used a mixture of belladonna, nitric and chloric ether *freely*, and opiates occasionally.

XXXVI. Anonymous, Boston.

Remarks. The case occurred on the last of three consecutive days of the most intensely cold weather of the season. [Contrast this fact with the warm damp weather which marked the commencement of the disease at Westfield, in 1857. See page 79.]

There were chills at first, followed by general pains and vomiting. The child ate her breakfast as usual, and went to school apparently in good health. She was seized while in school, and died in less than forty-eight hours.

XXXVII. Dr. A. A. GOULD, Boston.

Treatment. The jaws were so rigid that no internal remedies were effectually used after first day. Cold to head and back of neck—heat to the feet—frictions and stimulants to surface.

Remarks. The patient was five months pregnant—aborted on second day—no relief to rigidity, and no return of consciousness afterwards—except there was always moaning expressive of pain on any attempt to turn the head or move the body.

XXXVIII. Dr. J. F. GOULD, South Boston.

Treatment. Ice to the spine—laxatives—broth. Owing to an abscess of the throat, one patient could not swallow food or nourishment, except for about twenty hours of the first part of the disease. This case was fatal.

XXXIX. Hospital case under care of Dr. J. B. S. JACKSON.

Treatment. Leeches to the renal region. Pulv. Dov.—Hoffman's Anodyne—the first three days took Rx Pulv. opii gr. $\frac{1}{4}$; Antim. tart. gr. $\frac{1}{8}$; Hyd. submur. gr. j.; ter die.—After that, symptoms were treated as they came on.

Remarks. "This case has been marked as cerebro-spinal meningitis, as it is believed to have been a case of the disease described under that name; not that I think there was any proper inflammation of the membranes." Signed,

"JACKSON."

XL. Hospital case under the care of Dr. A. A. GOULD.

Autopsy. Head. The pia mater at the base of the cerebellum, around the medulla oblongata, in two very limited portions near the vertex, and in one posterior lobe, was infiltrated with thick pus. The ventricle contained about 3ij. of turbid serum. The substance of the brain appeared normal.

Spinal Cord. The spinal cord was so much swollen in the cervical portion as to fill the canal. The pia mater throughout was opaque, and more or less infiltrated with pus. While contained within the membranes, the cord felt very firm, and was much stiffened, but on incision it proved to be decidedly softened.

XLI. Cases at City Hospital in Boston, reported by Dr. J. N. BORLAND.

Treatment. In the cases that recovered ergot was used, being suggested by Dr. Upham. Ice to the head and sinapisms to the feet were also employed. A chloroform epithem to the epigastrium in one case quelled pain, and convulsions, and procured some sound sleep. The patients, three in num-

ber, which came under Dr. Borland's care, were stimulated and nourished as highly as possible.

Remarks. By a singular coincidence, the five cases at the City Hospital all occurred on the same side of the same ward, at about the same time. The windows on this side of the building look towards a piece of wet miry ground, but were closed when these cases occurred, as it was in the winter season. All the wards of the hospital are supplied with fresh air pumped through the heating apparatus from one and the same source—an aperture of entrance directed towards the hills of Roxbury, and away from the miry ground just mentioned. The cases occurred in patients convalescent from other diseases, except one who had pneumonia at the time the cerebro-spinal meningitis set in. "Their severity," says Dr. Borland, "in the three last at any rate, was proportionate to the constitutional strength of the patients. They all had intense spinal pain and tenderness, headache, and praecordial pain. Their positions in bed were very similar. There was likewise a similarity in the almost unconquerable constipation during the severity of the sickness; and the marked relapses of each of the three after convalescence were apparently well established. They were daily seen by Dr. Upham, who recognized them as the same disease he had seen so much of in the Stanly Hospital.

XLII. Cases at Gallop's Island, reported by Dr. CALVIN G. PAGE, Post Surgeon.

Remarks. In the case where opisthotonus was replaced by *emprosthotonus*, the body was bent not only forward but to one side, so that the patient was made frequently to roll over to that side and out of bed.

In several among the fatal cases, the symptoms were imperfectly developed. But "by exclusion" they were classed with the others. Dr. Page says, that other cases also, but of a mild character, occurred, though they hardly deserve mention. He adds that erysipelatous eruptions occurred on the third or fourth day of attack (in those of course who

lived long enough); and further, that in all cases where the patient was conscious, soreness of the limbs and feet prevailed. In most cases there were involuntary discharges from the rectum and bladder.

XLIII. Cases at Fort Warren--reported by Dr. JOEL SEAVERNS, A. A. Surgeon U. S. Army.

Remarks. Dr. Seavers says two features have particularly struck him, as worthy of mention in the history of his cases—the one, an excessive cutaneous sensibility at the outset of the disease, to such a degree that the patient, even when almost in a state of syncope, shrieks and cries out at the most trifling pressure: the other is the tendency to *relapse* which seems to be, says Dr. S., in a degree periodical, so that the patient, if he survive the first invasion, becomes apparently convalescent by the third or fourth day, to be again much worse after a week, when another improvement occurs, and a second relapse; and so on, till the patient's strength becomes exhausted.

The case reported as of thirty-seven days duration survived several of these renewed attacks, and at length died from the exhaustion consequent thereon, and a parotid abscess; having been repeatedly convalescent as it seemed. Each of these relapses commenced with severe pain in the back of the head and neck, followed by delirium, and increase of fever.

RESULTS OF AUTOPSIES IN MASSACHUSETTS.

Autopsies in Massachusetts, as elsewhere, have been few in this disease. All that we have collected, however, from this State, in well marked instances of the disease, tell the same story of *meningeal inflammation*. A summary of them would be but a repetition of what is contained in the descriptions quoted in the earlier part of this report.

RESULTS OF TREATMENT IN THE TABULATED CASES.

Setting aside the treatment by ergot (in three cases at the City Hospital in Boston) and some matters of detail, we may say that the following have been the modes of treatment resorted to in our collection of cases, viz.: antiphlogistic; stimulant and supporting; that of liberal drug medication; perturbating; expectant. But, we are unable to *generalize* in favor of any of these. That which has been followed by a happy termination in one group of patients, has, in another set, been less fortunate.

THE INVASION OF THE DISEASE.

Although, as we have before remarked, we desired to make the list of queries in the circulars as short as the purpose of our inquiry would admit, we regret that we did not put the question whether the invasion of the disease was *sudden* or otherwise.

We however take the liberty of supplementing the deficiency on that point by borrowing the following statements of the results of investigation of the subject, by M. Tourdes, in France. One paragraph we translate from the "Compendium de Médecine Pratique," by Monneret and Fleury, as follows:

"It has been generally said that the approach of epidemic meningitis is not announced by any precursory symptom. M. Tourdes declares, on the contrary, that it is far from true that the patient is invariably struck down at once (*que l'invasion foudroyante est loin d'être constante*); that such an event is the exception, and not the rule; and that it took place in only a quarter or a third of the cases at most."

Valleix also quotes from the same observer—M. Tourdes—as to the order of frequency of the precursory symptoms, as follows: "Cephalalgia, 33 times; chills, 13 times; nausea and vomiting, 13; rachialgia, 3; pains in the limbs, 2; ver-

tigo, 2; general discomfort (malaise), 2; diarrhoea, 2; delirium, 1; trembling, 1; febrile movement, 1."

Dr. George G. Tucker, of Westfield, it will be recollectcd, in his remarks on the sixteen cases furnished by him for our tables, gives a good description of the different modes of invasion.

RELIABILITY OF THE CASES.

In stating the number of towns variously heard from, we mentioned three as doubtfully reported. The cases from those towns are not the only doubtful ones we have received, as others have come in from places otherwise affirmatively reported.

We have entered two or three cases on the *ipse dixit* of the reporters, where we had no reasonable doubt of the accuracy of the diagnosis. But we have taken the liberty of rejecting in some instances, and we think the cases in the tables are reliable. It must be remembered that spotted fever, or cerebro-spinal meningitis, presents different groups of its symptoms in different subjects; and therefore, though the symptoms set down in the tables may have been only partially, or scarcely at all present in particular instances, yet, on reading the accounts of the cases furnished us by their observers, it may be obvious that they belong to the disease in question. On one occasion, where certain cases looked bare in the tables, we wrote to their reporter asking the grounds of his diagnosis, and received in reply a graphic description which left no doubt that the cases were properly included in our list. Again, the symptoms, such as they are, are sometimes imperfectly developed, and yet by the process of exclusion the cases may be rightly classified with others of the disease under consideration, as evidently belong *nowhere else*. For example : Dr. Page says of his experience at Gallop's Island, "in several among the fatal cases, the symptoms were imperfectly developed, but by exclusion they were classed with the others."

We shall take occasion presently to offer an account of certain doubtful or spurious cases. In the mean while we give some additional cases, which arrived too late for insertion in the tables.

ADDITIONAL CASES.

Five cases in Montague, Franklin County, reported by E. A. DEANE, M.D.

They were taken sick respectively January 16th, March 29th, April 13th, April 26th, May 4th, 1864. Dr. Deane had no idea of the source of the disease. The cases showed no preference for any particular locality—high or low, damp or dry. They occurred in different parts of the town, which is partly hilly and partly level, settled by a farming population. They were in places rather sparsely settled. They made no distinction between the wealthy or poorer classes. The ages were eighteen, six, ten, twenty-one and forty-two years. The disease seemed to prevail as an epidemic in this and the adjoining towns. Dr. Deane saw other cases in consultation, in the surrounding villages.

The average duration of the cases was about three weeks. The greatest duration was six weeks. The shortest duration was, for the fatal cases, six days; for those that recovered, three weeks. Three of the five cases had convulsions. There was headache in all—very severe in some of the patients. Four out of five were delirious. Some could not give logical answers; others could a part of the time. The two that died had severe opisthotonus. It came on gradually, grew worse and worse till a short time before death. The muscles all relaxed just before the patient ceased breathing. Two of those that recovered had *slight* opisthotonus. Thus, one of the patients was free from the symptom entirely. Dr. Deane thinks nearly all had tenderness at the nucha. One patient only had pulmonary or pleural symptoms. These were very peculiar. The patient at one time would have all the symptoms of severe inflammation and congestion of one

lung. In a few hours these symptoms would disappear, to be replaced by symptoms referable to some other organ—the heart, the liver, the bowels or the other lung. When the thoracic or abdominal organs were involved, the head was relieved. At one time the breathing was very much oppressed, and there was bloody expectoration. In a few hours bloody dysenteric discharges from the bowels set in. Then all these symptoms would disappear, and the head symptoms return. Petechial spots were frequently seen on different parts of the body, varying in appearance; sometimes of a scarlet redness, at others dark livid or purple. These would appear and disappear at short intervals. For three or four days during the second week, the whole surface was quite yellow, having a very decidedly jaundiced look. This patient recovered.

It does not appear in Dr. Deane's report whether the other patients had petechiae or not. Two cases terminated fatally; one on the seventh day, the other on the sixth day. Three recovered, but very slowly.

Autopsy in one case. There was inflammation of the meninges, with abundant deposit of coagulable lymph, more abundant at the base of the brain and near the foramen. This extended down the spinal cord as far as examined.

Treatment. Dr. Deane adopted no definite plan of treatment, but managed each case according to the indications as they presented themselves. He used cold applications to the head; counter-irritation over the spine, with stimulating liniments, mustard, or blisters; hydriodate of potassa and opiates internally; also expectorants, alteratives, cathartics, astringents, tonics—as the cases seemed to require.

PROBABLE CASES.

We have now to present two cases reported to the Boston Society for Medical Improvement, in February, 1866, by David W. Cheever, M.D., as *probably* instances of "cerebro-s pinal meningitis."

CASE XIII. Nov. 23d, 1865. Mr. G., about 40 years old, of rather feeble physique, a stone polisher by trade, after great exposure, was attacked with pain in back, nausea, chill, and general febrile symptoms, on Saturday evening. These symptoms continuing, I was called to him on Thursday, Nov. 23d. He then had a feverish look, strong typhoidal odor, coated tongue, back ache, and constant retching of bilious matter; pulse not remarkable. This bilious vomiting continued two days, when on Saturday it changed to vomiting of blood. This was constant in large quantities, fluid and not much altered by digestion, for two days. It was uncontrolled by the remedies used. The spleen could be felt much enlarged. Bowels otherwise not remarkable. Mind clear, tongue brown and dry.

An eruption of violet-colored petechiae resembling typhus appeared on back on Saturday, and became very numerous over abdomen. He died on Monday, five days after I saw him, eight days after first symptoms. No *autopsy*. Surroundings of patient very bad. I regarded the case as malignant typhus.

CASE XIV. *Cerebro-Spinal Meningitis, latent until twelve hours before Death.*—Miss —, 50 years of age, fair health, complained Monday, Feb. 19th, 1866, of pain in foot, back and bowels, followed next day by nausea and vomiting; return of a pale discharge from vagina—menstruation having ceased one year previous. This discharge lasted three days. *Wednesday evening, Feb. 21, 1866*, ten o'clock, I saw her first. She had just gone to bed, having been up all day. Aspect a little flushed; pulse 100; nervous, irritable; complaining of bilious retching. No dejections for some days. Flatulence and pain in small of back. Ordered calomel and bi-carb. sodæ.

Thursday. Two sufficient dejections; less retching and flatulence; aspect about same; very nervous; restless; apparently exaggerates her troubles; much rheumatism in family; complains of being unable to move freely on account

of her back, which is without feeling, she says, in lower part; somewhat painful; not tender; no paralysis of limbs or face; eyes natural; no photophobia; hearing normal; tongue moist, thin white coat; pulse 100. Ordered 10 grs. Dov. powder, liniment to back and hot drinks for diaphoresis.

Friday, A.M.—Vomited Dov. powder, and continued to retch a good while—otherwise seems better; skin moist, tongue thin white coat, pulse 80; a little desire for food. Says her back is better, and moves herself more freely. Ordered beef-tea.

11 P.M.—Called to her again. A very little delirious—coherent on being roused—complains that pain in back has shifted to nape of neck; restless, having had no good sleep for several nights. Tongue same—pulse 100; skin soft and moist. Ordered morphia, gr. $\frac{1}{5}$, and repeat if necessary.

Saturday, 9 A.M.—A bad night; restless, delirious; pain in nape of neck severe; jactitation; entire incoherency; vague apprehensions; seeking to avoid her attendants; creeping out of bed; moves limbs freely; no opisthotonus. Pupils obey light; tongue brown and dry; pulse 130, weak, and uneven; subsultus tendinum. Urine passed voluntarily; abdomen not swollen. Aspect of grave disease. Prognosis doubtful. Diagnosis—cerebro-spinal meningitis or malignant typhoid.

11 A.M.—Seen in consultation by a gentleman of large experience. To test the diagnosis from the history of the case, this was detailed to the consulting physician by a relation who had attended the patient throughout, and the case was closed with the events and treatment up to last evening. The impression made on this gentleman was of a nervous case, probably in great measure hysterical. On entering the chamber he concurred with me in thinking she had but a few hours to live, and that the case was one of cerebro-spinal effusion. The patient was wholly insensible, lying on her right side, breathing heavily, but without stertor; covered with perspiration; tongue brown and dry; mouth open; pulse 160, very feeble and thready. Right pupil widely

dilated, and insensible to light; cornea looking as if breathed upon; left pupil natural, and responding sluggishly to light. Nothing abnormal in lungs or heart; bowels soft and not tympanitic; face a little drawn to right side; limbs not paralyzed; no opisthotonos; no petechiæ. In this condition she remained until she expired in a convulsion at 3 P.M. No autopsy could be obtained. The surroundings of the patient were of the best description. No other cases have been reported in that section of the city; and she herself was in average health, the week previous, and up and about her chamber sixty hours before her death. Can any other solution, says Dr. Cheever, of the problem, be offered so probable as cerebro-spinal meningitis?

CASE XV. *Blindness as a sequela of probable Cerebro-spinal Meningitis.* Case furnished by Dr. H. W. WILLIAMS, of Boston.

A young man of sixteen years, well developed and of very strong constitution, was seen on the 11th of March, 1866. The account given of his previous symptoms was, that he had been suddenly attacked about five weeks previously, with severe cerebral symptoms, accompanied by an appearance of spots all over the skin. He continued unconscious about a week, when he began to improve, and from that time gained rapidly. No further history of the case was obtained except that his eyes remained staring open during much of the period of delirium, and they were from that time greatly injected. His medical attendant had not, however, supposed the symptoms in his eyes to be serious, until alarmed by the appearance of matter in the anterior chamber of the right eye.

On examination it was evident that a deep-seated exudation, of a yellowish color, existed in both eyes. In the left eye the iris had lost its healthy aspect, and the edge of the pupil was extensively fastened by adhesions to the capsule of the lens; but, as in the other eye, the crystalline remained transparent. In the right eye the iris had a more healthy

look, though some adhesions existed. It seemed as if the matter in the anterior chamber had its origin in the collection near the fundus of the eye, and had found its way through the pupil. Scarcely a perception of light remained.

CASE XVI. Reported to the Boston Society for Medical Improvement, May 9, 1864, by Dr. C. ELLIS. *Symptoms of Cerebro-spinal Meningitis; doubtful appearances of Disease of the Pia Mater of the Brain and Spinal Cord.*

A child, seven years of age, was attacked eleven weeks before death with fever and pain in the frontal region. Ten days after the commencement of the disease, the head was drawn strongly backwards, and opisthotonus became so marked that the shoulders did not touch the bed. This continued until three weeks before death. The pupils were dilated from the commencement until the last day, when they became contracted. Though delirious, the child could always be roused. The pulse at the outset was extremely rapid, hard, full and strong, and so continued for more than six weeks, when it became nearly natural. No nausea nor other symptoms referable to the digestive organs. No chills. No petechiæ until towards the close, and then only to a slight extent. The above were the principal symptoms, obtained from Dr. HOLMES, of Milton, who had charge of the patient. There were no special changes towards the close, and death seemed to result from exhaustion.

On examination of the head, the arachnoid was found dry, and the convolutions somewhat flattened. The lateral ventricles contained from four to six ounces of clear serum. The membranes of the base had a slightly opaque appearance, and were somewhat infiltrated, but there were no miliary granulations nor other evidences of disease. The arachnoid and pia mater of the spinal cord were perhaps opaque, and somewhat peculiar, but neither the changes here nor in the membranes of the brain would have attracted special attention, had it not been for the epidemic of cerebro-spinal menin-

gitis prevailing at the time. The thoracic and abdominal viscera were not examined.

The case was regarded as interesting, says Dr. ELLIS, inasmuch as morbid appearances not unfrequently met with were accompanied by symptoms which pointed to a lesion of the membranes of the brain and spinal cord, and yet the latter could not be clearly shown to exist. May it not indicate, he asks, that the symptoms of ordinary disease can be modified by the prevailing epidemic influence, although peculiar lesions are not satisfactorily made out?

DOUBTFUL OR SPURIOUS CASES.

It having been alleged that the disease under consideration has prevailed at Amherst College among the students, we present the following note we have received in relation to the matter.

“AMHERST COLLEGE, August 8, 1865.

“Dr. PARKS,—*Dear Sir:* I answer your printed inquiries not so much because I can give you any light that you ask for, but merely because we have had a disease in our College, which our older physicians, for want of a better name, have termed meningitis.

“For the past two years here, in College—and especially during spring and summer—several of our students have been affected with something like the following symptoms. An intense pain all over the head, and in some part of the spinal cord—generally the upper. This is accompanied by great prostration, and in the worst cases study has been out of the question. All the other functions are maintained with regularity, and never has there been anything like delirium or convulsions attending the disease.

“Belladonna has generally had a good effect, and large doses of whiskey also. And in the worst case we had, whiskey would always reduce the pulse as long as the effect of it lasted. * * * * Yours, truly,

(Signed)

“E. HITCHCOCK.”

We shall not assume to pronounce upon the cases at Amherst College; but they remind us that more than one observer of spotted fever, or cerebro-spinal meningitis, has reported having seen, during the prevalence of the disease in his neighborhood, mild cases, or cases "not worth mentioning," that were, as we infer, instances of the existing epidemic, or colored by the prevailing epidemic influence.

PATHOLOGY.

We come now to the question what, in the light of present experience, is the "spotted fever," otherwise termed "cerebro-spinal meningitis"? As in the case of the epidemic of 1806 to 1815, we must reply that it is easier to say what it is *not*, than what it *is*.

Discarded opinions. Various fallacies as to the pathology of the disease—for example, its location among the exanthemata—having soon died out, the idea of its having been a form of intermittent or remittent was started, but seems now to have been laid aside, and for reasons already given.

The Typhus Theory. There are some who still regard the disease as a form of British Typhus. In France, M. Boudin declares that cerebro-spinal meningitis is nothing but a species of typhus fever, and assigns to the affection the name of *cerebro-spinal typhus*—a term somewhat similar to that used by some among the Germans—*cerebral typhus*. Valleix remarks that the memoir of Boudin would strongly incline us to admit that many epidemics denominated *typhus* were epidemics of *cerebro-spinal meningitis*, but that such admission is a different thing from the adoption of the writer's conclusions. As to the facts, he says, presented in former writings and supposed to have a bearing upon this question, they are neither sufficiently detailed, nor precisely enough stated to be of real utility in the investigation of it.

In this country, Dr. Baltzell, in the October number of the American Journal of Medical Sciences for 1865, enters into an elaborate comparison of the spotted fever with typhus, to

show the resemblances between them. In relation to the spots, Dr. Baltzell finds that of 27 cases of spotted fever there were *petechiae* in a little over 61 per cent. He then shows that in Rayer's 194 cases of typhus, the percentage of *petechiae* was 80; in Gerhard's 36 cases it was 88; in Stoker's 540 cases, a little over 71; the average percentage of the three observers being, as we make it, nearly 80. Dr. Baltzell claims that the difference ($18\frac{1}{2}$) in the percentage of *petechiae* between spotted fever and typhus, is not sufficiently great to separate the two diseases; especially, he says, since ecchymosis, vices, efflorescences, &c., have been seen in cases of typhus, as well as in spotted fever. In our Massachusetts statistics of spotted fever, we will remark, by way of parenthesis, the proportion of *petechiae* or analogous spots was somewhat less than 59 per cent. of 250 cases competent to be reckoned upon.

On the other hand, however, in a German epidemic of cerebro-spinal meningitis, referred to by the editor of the British Medical Journal, no eruption in the slightest degree analogous to the typhus rash was met with in any instance; while another eruption—herpes labialis—was observed in the greater number of cases.

Dr. Stillé remarks that the spots would seem not to belong essentially and exclusively to any disease, but to indicate a certain condition of the blood, and also perhaps of the solids; since they are liable to occur in other diseases, as yellow fever, scurvy, purpura, &c.

Professor Murchison, Physician to the London Fever Hospital, one of the chief authorities on typhus fever, takes ground in favor of the identity of "spotted fever" and typhus in the following line of argument.

"It is well known," he says, "that among the phenomena of typhus the cerebro-spinal symptoms hold a very prominent place. First, there is headache, with vertigo and injected conjunctivæ; then come restlessness, sleeplessness and delirium, followed by stupor or coma. With these symptoms may be associated paralysis of the sphincter or of the detrusor muscles of the bladder, hyperæsthesia, tremors,

floccitatio, subsultus, or general convulsions, strabismus, tetanic rigidity of the muscles of the limbs, or even opisthotonus. Occasionally typhus commences with violent delirium, and other cerebral symptoms, so that more than once I have known it mistaken for acute mania." * * *

" Among the most common anatomical lesions of typhus, are engorgement of the venous sinuses of the dura mater, increased vascularity of the pia mater, and an accumulation of serous fluid in the ventricles, and in the subarachnoid space of the brain and cord.

" It is not many years since these symptoms and lesions were believed to be the result of inflammatory action in the membranes of the brain and cord, and the treatment of typhus was based upon this belief. But the researches of John Reid and of all subsequent observers have demonstrated that there exists no relation whatever between the degree of vascularity and the amount of sub-arachnoid fluid on the one hand, and the severity of the cerebral symptoms during life on the other, while it is now universally admitted among pathologists that the lesions of typhus are quite independent of inflammatory action. This is the result of my own observations ; and the investigations of John Reid, Peacock, Jenner, Jacquot, Barrallier, and of all modern observers who have had much experience in the *post-mortem* examinations of typhus, lead to the same conclusion." * * *

" But, to the rule above laid down, there are exceptions. In rare cases typhus fever is complicated with unmistakable inflammation of the membranes of the brain. At the time of publication of my work on Fevers, I was under the impression that this complication never occurred, but subsequent experience has convinced me that I was mistaken. In the interval I have met with two unequivocal cases of typhus complicated with true meningitis and the effusion of lymph on the surface of the brain." * * *

The drift of the argument here seems to be, that in respect of the morbid appearances within the cranium, spotted fever and typhus stand upon the same footing.

"It is possible," the Professor continues, "that some of these epidemics [meaning epidemics of alleged cerebro-spinal meningitis] were really examples of primary inflammation of the cerebral and spinal membranes; but when this seemed to be the case, it is to be noted that the persons attacked were comparatively few, that no eruption appeared on the skin, and that there was no evidence of the disease being infectious. I would instance in particular the epidemic described by Dr. Mayne, as attacking children in several of the Irish workhouses in 1846, with regard to which the absence was noted of any proof that it has ever been propagated by contagion." * * *

"If to the above characters [the symptoms and morbid appearances of the present epidemic, including the alleged occasional absence of traces of meningeal lesion] be added, the fact that its contagiousness is a disputed question, and that it has been found to prevail chiefly under circumstances of over-crowding and inadequate ventilation, it cannot be surprising that many American physicians admit the close relation of cerebro-spinal meningitis to typhus, while some maintain the identity of the two diseases. It may be well therefore to consider the four points of distinction between them, laid down by Dr. Lidell, and in doing so I adopt the writer's own words:

"1. 'Spotted fever often runs its course in a few hours. Typhus requires at least several days.' The rapid course of many of the American cases, and of epidemic cerebro-spinal meningitis generally, is no doubt remarkable, but is not sufficient to found a distinction, for many cases of typhus are on record where the disease has terminated fatally on the second or third day, or even after a few hours." * * *

"2. 'Spotted fever is frequently attended with convulsive movements; typhus fever is never so accompanied.' My experience of typhus is precisely the reverse. Convulsive movements are not uncommon." * * *

"3. 'Spotted fever patients often die suddenly and unexpectedly of coma and asphyxia; typhus patients do not

die in this way.' According to my experience of typhus, the most common mode of death from the primary fever is by a combination in various proportions of syncope and coma. A large proportion, also, of fatal typhus cases are complicated with pulmonary disease, and then death occurs by coma and asphyxia. Moreover, I have repeatedly known patients who appeared to be going on well, become suddenly comatose, and die in a few hours."

"4. 'The eruption in spotted fever frequently appears on the first day; while in typhus the eruption does not appear till the end of the week or more.' According to my experience, the eruption of typhus usually appears on the third and fourth day, is rarely delayed beyond the sixth day, and may sometimes be noted on the second day. It is well known that in severe cases of most blood diseases petechiae may appear as early as the first day. The sooner the eruption of variola appears, the more grave is the case."

Professor Murchison expresses the opinion that "the grounds for drawing a specific distinction between the epidemic cerebro-spinal meningitis or spotted fever of America and typhus fever, are most inconclusive, and particularly when it is recollectcd that typhus fever, running the ordinary course, has been prevailing in many parts of America since the commencement of the present war. I agree entirely with the opinion expressed by Dr. Upham." The Professor then quotes from Dr. Upham's paper on the disease at Newbern, in which monograph the opinion approved by the former is stated in these words: "The disease seemed to me rather to partake of the nature of typhus in a severe and malignant form, * * * having in this instance a special direction to the meninges of the brain and spinal cord." Dr. Murchison pays a just tribute to the ability of Dr. Upham's memoir.

It is not our province to enter into the discussion of the pathology of the disease, but it is perhaps our duty, as reporters, to note that where Professor Murchison says that the contagiousness of spotted fever is a disputed question, the

medical profession of *this* country should have been excluded from the list of disputants, since its non-contagiousness is very generally taken for granted here. Again, in stating that the disease has been found to prevail chiefly under circumstances of over-crowding and inadequate ventilation, the remark is hardly applicable to the United States, where in civil practice the reverse has been the rule. The learned Professor, we presume to suggest, may have been laboring under some confusion in classing together, as he does in his paper, the American with some other European epidemics, and with the Russian Plague.

Further, Dr. Murchison mentions the cerebro-spinal meningitis of the Irish work-houses in 1846, described by Dr. Mayne, as an example of "some epidemics" which he thinks were possibly real instances "of primary inflammation of the cerebral and spinal membranes." The absence of eruption in, and the non-contagiousness of the Irish cases, tally—the former with what has often—the latter with what has generally—been noticed in this country. And, the cerebro-spinal meningitis of Dr. Mayne has frequently been quoted by American writers as a disease, the counterpart of our "spotted fever." We will venture, also, one more criticism. It seems to us that Dr. Murchison compares what is the exception in typhus with that which is the rule in spotted fever.

We can conceive that on the negative side of the question of the connection of "spotted fever" with typhus, the same line of argument may be used as that of Dr. Holmes in speaking of the epidemic of 1806 to 1815—that a disease which is sometimes almost as sudden in its invasion as a stroke of lightning; which is rarely suspected of being contagious; which gives us a solitary case in a ship of war, a single case in a boarding school, two cases only in an almshouse; which in civil practice affects the villages and isolated farm-houses of the interior (where typhus "running the ordinary course" is unknown) as much at least as the large cities; which in a great majority of cases is fatal in a few days or even hours; the mortality of which is very variable: such

a disease presents so many points of difference, when compared with British typhus, that we should hesitate before pronouncing the two identical.

In fact, the editor of the British Medical Journal, commenting, in the number for July 8th, 1865, on Dr. Sanderson's description of cerebro-spinal meningitis in Germany, contrasts the differences between that and typhus, with the result that "it is impossible to place the two diseases next to each other in the nosology, much less to admit their identity."

The Inflammation Theory. Among those by whom the typhus and other above-mentioned theories are disowned, the question of the pathology is narrowed down to this alternative, viz.: either it is a form of cerebro-spinal meningitis (typhoid, some would say), or else it consists in its essential nature and primarily of some occult change, other than typhus—some alteration of the fluids or solids of the economy—the meningeal lesion being a secondary phenomenon.

The former view is maintained by Dr. Stillé, and others, who hold that meningeal inflammation is declared by the symptoms and *post-mortem* appearances.

As bearing on this side of the question, we translate from the "Compendium de Médecine Pratique" the following analysis of blood taken from patients with cerebro-spinal meningitis.

"The blood was rarely buffy. In cases where there was a buffy coat, it was thin, variegated, imperfect. In the dead subject the blood was remarkable for the abundance and the density of fibrinous clots. The blood was submitted to analysis according to the process suggested by M. Dumas, and followed by MM. Andral and Gavarret."

First Experiment, second Day, third Bleeding.

Fibrine,	.	.	.	.	4.60
Globules,	.	.	.	.	134.00
Solid matter from serum,	.	.	.	.	71.16
Water,	.	.	.	.	790.24
					1000.00 parts of blood.

Second Experiment, second Day, first Bleeding.

Fibrine,	.	.	.	.	3.90
Globules,	.	.	.	.	135.54
Solid matter,	.	.	.	.	79.64
Water,	.	.	.	.	780.92

Third Experiment, second Day, first Bleeding.

Fibrine,	.	.	.	.	3.70
Globules,	.	.	.	.	143.00
Solid matter from serum,	.	.	.	.	58.50
Water,	.	.	.	.	794.80

Fourth Experiment, third Day, second Bleeding.

Fibrine,	.	.	.	.	5.63
Globules,	.	.	.	.	137.84
Solid matter,	.	.	.	.	60.33
Water,	.	.	.	.	796.20

"It will be seen," the writer continues, "that the quantity of fibrine is between 3.70 and 5.63; that is to say, between a minimum,* which is already a pathological condition, and the figure which is only reached in well-marked phlegmasiae." * * * "The decided increase in the fibrine is an experimental result of great importance, and one which assigns to epidemic cerebro-spinal meningitis the rank occupied in nosography by the phlegmasiae of the serous membranes. But the epidemic constitution impresses upon these phlegmasiae a more rapid march, and a greater gravity

* In Carpenter's Physiology we are told of a healthy specimen of blood giving, by each of four different methods of analysis, 1.56 parts of fibrine in a thousand; another specimen, 1.95 parts, by all the same four methods of examination. Carpenter estimates the *average* amount of fibrine in health on the basis of the analysis of Lehmann (quoted also by Dalton), who makes the proportion of fibrine in the *plasma* alone of the blood, to be 4.05 parts. As the plasma constitutes about half the entire volume of the circulatory fluid, Carpenter sets the proportion of fibrine in the latter at 2.025 parts in a thousand.

than obtains in sporadic inflammation of the meninges. That is the only point in which they appear to us to differ from the latter. [?] In a case of cerebro-spinal meningitis, MM. Andral and Gavarret ascertained an increase in the fibrine of the blood.

"There have been found in the heart and large vessels fibrinous clots, thick, yellowish, quite adherent to the columnæ carneæ. Some authors, it is true, speak of fluidity of the blood ; but their observations are wanting in detail."

The opponents of the theory that the inflammation in spotted fever is the primary pathological fact, claim for the support of their position : first, the different behavior of the disease from that of ordinary meningeal inflammations ; secondly, the futility in that malady of all the means usually more or less influential in combating such inflammations ; thirdly, the occasional occurrence of cases, at the autopsies of which no morbid appearances within the cranium have been detected.

The first point—the different behavior of the disease in its course from ordinary meningitis—will perhaps be explained by the typhoid character of the epidemic. The second point —its resistance of the ordinary remedies of meningeal inflammation (always provided it be proved that it is never benefited by depletion)—may also, perhaps, be disposed of in the same way.

It remains, therefore, to consider the allegation that there have been cases in which no traces of meningeal inflammation were found on *post-mortem* examination. If such cases can be fully made out, they will afford very strong ground for the opponents of the theory that the inflammation is primary. Cases VI. and VII., pages 45 and 47, are in point. In those, we are told, no traces of inflammation within the cranium were detected. It would have been more satisfactory, however, if it had been definitely stated whether there were or were not *dryness* or *opacity* of the meninges. Those changes were found without other lesion in some of the more rapid and violent cases reported by French authors, by whom

they were yet considered instances of cerebro-spinal meningitis. Instances occurred, too, it will be remembered, in the old New England epidemic, where, in rapid cases, only turgescence of the cerebral vessels was found; whence the observers concluded, not that inflammation was absent, but that it had not time to develop so as to leave traces evident to the eye. But we may appropriately introduce here the concluding portion of a letter (already referred to), kindly forwarded to us, at the request of Surgeon General Barnes, by Assistant Surgeon J. J. Woodward, Brevet Major U. S. A.

"A large number of interesting histories of cases and accounts of autopsies have been collected from the reports of medical officers, and several specimens of the brain and spinal cord, in these cases, have been received at the Army Medical Museum. The medical history of the war, now preparing in this office, will contain a careful discussion of this material, which is not yet ready for publication. In a general way, however, I am permitted to inform you, that there were at least two classes of cases brought under the observation of this department. In the first, the autopsy disclosed grave anatomical lesion of the cerebro-spinal axis, accumulations of serum, sero-pus, pus, or tough yellow lymph, especially in the ventricles about the base of the brain, and in the upper part of the spinal canal. In the second class of cases, no perceptible anatomical lesion in the cerebro-spinal axis was observable. These two groups of cases rest upon equally reliable evidence, and are not to be disposed of on the supposition that the latter represent merely an early stage of the former, since it is to be remarked that *both* anatomical conditions appear to have been found indifferently in protracted cases as well as those which proved suddenly fatal. For a full discussion of this interesting subject I must ask your patience until the official publication of the medical history of the war. A judicious compilation of the experience of the medical department, as to any one disease, is not possible until the exhaustive examination of *all* the records of the office now progressing is completed,

since at every step new facts are acquired, and the premature publication of fragmentary and incomplete information would be the more deplorable, as a comparatively brief period will bring the whole into a proper shape for communication to the medical world."

We await with great interest the publication of the valuable work referred to in the preceding extract. When that shall appear, the morbid anatomists will probably tell us what interpretation to put upon the results of the autopsies. We therefore here leave the question—whether or not the inflammation in spotted fever is primary—*sub judice*. But in the mean while we may state some of the theories held among those who advocate the negative side of the question.

Further Statement of Opinions concerning "Spotted Fever."—Some of those who deny that the inflammation in the disease before us is the primary pathological fault, claiming that the *fons et origo mali* is behind the inflammation—as for example in the blood—are disposed to classify cerebro-spinal meningitis with certain other affections corresponding more or less with it, but in which the local manifestations during life and after death relate to other tissues or organs than the meninges. Especially has it been assimilated to *typhoid pneumonia*. In casting about for leading facts which might bear upon this theory, we came across the following, which we offer in its behalf, so far as relates to the affection last mentioned.

One of our Massachusetts correspondents has mentioned that the spotted fever in his town was followed by an epidemic of typhoid pneumonia, in which there was great correspondence—*mutatis mutandis*—in the symptoms of the two sets of cases. In like manner the old spotted fever, so-called, was followed in a portion of New England by an epidemic of typhoid pneumonia, in which, as Dr. James Jackson informs us, there was a good deal of similarity between some of the leading symptoms and those of the recognized spotted fever of that day.

Dr. Burne, of the Westminster Hospital, England (as Dr. Condie states in his edition of Watson), mentions that a great number of cases of what he calls the "spotted fever" were brought into that institution in the year 1838. He describes the affection as "an adynamic or typhus fever, combined with a latent and dangerous pneumonia, and exhibiting on the surface a very regular and uniform spotted eruption—not petechiae."

On searching the pages of Grisolle for information on the subject, we found a description of an epidemic of typhoid pneumonia observed by himself. He mentions having seen in some of the cases *petechiae* and *ecchymoses*. Grisolle strikes the key-note of our modern "Humorists," when he says that judging only by the cases he had observed, the intensity of the typhoid symptoms was almost always in inverse proportion to the space occupied by the pneumonia; a circumstance demanding, he asserts, the admission that the *pulmonary inflammation constituted only an epiphomenon, and that it was the consequence of some general alteration of the solids or fluids of the economy.*

In this connection it may also be interesting to recall the apparent metastasis from the head to the lung, and thence to other organs, with subsequent return to the head, in one of the five additional cases from Montague contributed by Dr. Deane. (Pages 115, 116.)

The theory in support of which we have collated the preceding facts (without intending, however, to mingle in the discussion), sets forth that in the so-called epidemic cerebro-spinal meningitis, and in typhoid pneumonia, &c., an essential disorder common to them, and assumed to be behind the inflammation, manifests itself, now in the head and spinal canal, by cerebro-spinal meningitis, now in the chest by typhoid pneumonia, and so on; and that the inflammation in the affections thus affiliated to each other bears the same relation to the essential disorder, that the sore throat in scarlatina bears to the general affection of the system in the latter disease. At least such seems to us to be the drift of the theory.

Dr. Levick (in the American Journal of Medical Sciences, No. 48, page 139) states it as his belief that there is an epidemic influence which shows itself in its mildest form as influenza; again as typhoid pneumonia; once more as cerebro-spinal meningitis; while in some cases the blood itself appears to be greatly affected without presenting at once the phenomena of disease of any special organ.

Connection with Diphtheria. Finally, diphtheria has in the same way been associated by some with cerebro-spinal meningitis.* Those who favor the theory of connection between these two diseases, are entitled to the benefit of the following facts reported on previous pages.

Dr. C. E. WARE says in his remarks (No. XXXIV.) on his cases, in several of them (seven in number) "diphtheria unequivocally existed. In one family where there were four cases unquestionably of the same disease" [spotted fever or cerebro-spinal meningitis], "the petechial eruption and the diphtheritic condition of the throat existed in some but not in all." It is fortunate for the cause of science that these cases fell into the hands of one whose diagnosis is above question.

Dr. L. E. MARSH, of Granby, also says, "in one case, a girl of 15, there was complication with diphtheria."

A case, not quite so much in point, perhaps, but highly interesting, was reported by Dr. W. W. GREENE, of Pittsfield. After remarking that the exudation [seen upon the meninges at his autopsies resembled very much that of diphtheria, Dr. G. says one man was violently attacked with cerebro-spinal symptoms, and abundant spots lasting for two days, when a copious exudation occurred in the throat, "and all the pain, delirium, opisthotonus, tenderness, &c., disappeared."

* We would refer here to the statement of one of the writers on the old spotted fever, that he generally found soreness of the throat in his cases when he looked for it.

We would remark that the co-existence of spotted fever or cerebro-spinal meningitis with diphtheria, typhoid pneumonia, &c., does not appear to the writer to *necessitate* the supposition that these affections are manifestations of zymotic or other general disorder behind them; but is equally well explained, perhaps, by the theory of simple typhoid inflammation.

One other hypothesis which we have never seen distinctly set up, seems to have been shadowed forth in some statements of facts. It is this: that while the true epidemic is purely a form of cerebro-spinal meningitis, there have been cases which have passed for instances of it, but which really consisted in other morbid conditions, modified or colored, as it were, by the prevailing epidemic influence. This would be an easy method (perhaps too easy) of explaining the cases mentioned on preceding pages, in which the post-mortem appearances were less indicative of meningeal inflammation than the symptoms.

DIAGNOSIS.*

Typical Cases. Observers will, we believe, concur in the statement that while all the symptoms are not represented in any one case, probably no two cases have the same groups of symptoms. A disorder, then, the pathology of which is undetermined, and in which the groups of phenomena are various in different individuals, would seem to be difficult of recognition. Yet, when fully developed, it need hardly be mistaken; and, as a general thing, those who have seen cases will, we think, know it when they meet with it. Its combinations of symptoms, when well declared, are peculiar; cluster around the cerebro-spinal axis, and are usually very rapid in their invasion. Also, the "process of exclusion" is of much avail.

* See Appendix A.

Cases Masked at the time of Invasion. When, however, the invasion is not sudden, as frequently happens, the formative stage may be insidious. If, then, the affection in question being prevalent, a person complains of headache, chilliness and nausea, not traceable to some other source, the physician, we would suggest, should be on the alert for this disease. Other symptoms, also, referable to the cerebro-spinal axis, and not pointing clearly to a different cause than the disorder under investigation, may be looked upon with suspicion.

Obscure Cases. But sometimes the symptoms are obscure during a great part or the whole of the disease, as in Case XI., page 56. When this is the fact, we know of no better guide than a careful comparison of the symptoms with the admirable description of them by Dr. Upham (quoted on page 22), and with other recorded cases. In rare instances, perhaps, where this disease is suspected, *doubt* will be the only rational opinion.

PROGNOSIS.

If the behavior of spotted fever or cerebro-spinal meningitis in this State be an index of its general course, we may deduce the following corollaries from our statistics of its *duration* and *termination*. First, the prognosis, during the first few days, at least, is grave; secondly, after four or five days have elapsed, if fatal symptoms be not present, the prospect becomes more hopeful; thirdly, the patient is not safe, even in convalescence, since there have been instances of fatal relapse.

THE NOMENCLATURE

Waits upon the pathology. With those who hold that the disease, on which we have been reporting, is a form of *typhus*, it has already been generically named. The views of some would, perhaps, be comprehended under the term *Typhoid*

Meningitis. Others would seem to consider "spotted fever" a peculiar *Toxæmia*. But, till the pathology be better settled than at present, we shall probably continue to speak of "*Spotted Fever*," or "*Cerebro-Spinal Meningitis*."

The Report is respectfully submitted.

For the Committee,

LUTHER PARKS, Jr., M.D.

Chairman.

BOSTON, MAY, 1866.

A P P E N D I X.

A.

AT our request, Dr. C. G. PAGE, of this city, sent us the following note upon the *diagnosis* of the disease treated of in the Report.

“ BOSTON, JULY 16, 1866.

“ Dear Dr. :—There is a single point in relation to cases of Cerebro-Spinal Meningitis, as they have occurred under my observation, that deserves to be recorded.

“ I refer to the very great difficulty in distinguishing the disease in its incipiency from the lighter forms of febrile attacks, or from simple disturbance of the system by slight indigestion.

“ Several of my cases presented this condition. One especially I recall, where there was only a general feeling of *malaise* in the morning, the patient having been perfectly well the day previous; at noon he was prostrate, and at night he died. I know of no means by which the disease could have been recognized when this patient first presented himself. Yet at noon it was clear enough. The knowledge of other cases existing, or an epidemic tendency to febrile diseases, should put us on our guard against giving careless or hasty opinions, in all cases where there is in our own minds the slightest doubt in relation to the simple symptoms first brought to our notice, and prognosis should be very guarded. I doubt whether, in the case alluded to, had the disease been recognized in the morning, medicine or treatment would have been of value. Very truly yours,

“ Dr. L. Parks.

CALVIN G. PAGE.”

B.

We received (too late to embody in the Report) from WILLIAM LESTER, M.D., of South Hadley, a circular from which we derive the following four cases. They occurred in Granby and South Hadley; in December 1864, March 1865, January 1866. Dr. Lester had no idea of the source of the disease. It showed no preference for localities "high or low—damp or dry"; "districts thickly or sparsely settled"; "the wealthy or the poorer classes." Three of the patients were adults. The average age was 26 years. The greatest age was 60 years, the earliest age 4 years. There were no evidences of contagion. The average duration of the cases was about 8 weeks; the greatest duration, 16–17 weeks; the shortest, one week. Three cases had convulsions. Two of the patients complained much of headache, which in one of them was very severe. Two were delirious; but could be roused to give logical answers. There was severe opisthotonus in one, slight in two. Tenderness at nucha was found in two. The pulse was hard and full in the patient aged 60 years, giving about 90 beats per minute. The pulse was generally feeble, and quick. There was usually not much pain in the bowels, which were generally constipated; the evacuations "showing a want of healthy bile." There was retention of urine in one case. In one case only were there petechiæ. They were upon the chest. In the child of 4 years there was great hyperæsthesia of the surface. The slightest touch would make it cry out, and bring on severe opisthotonus and spasms. It did not recover its speech for five weeks from the commencement of convalescence.

The treatment was "sometimes tonic and stimulant; at others sedative, with dry cupping and blisters."

Three of the patients recovered, and one died. There was no autopsy.

C.

The following case was sent to us May 26th, 1866, by P. L. B. STICKNEY, M.D., of Chicopee, Mass.

"The history of the case is peculiar. The patient was an unmarried girl aged 30 years, and who on a visit to Brooklyn, New York, was made the victim of a fraud practised upon her by an unprincipled physician, who in order to cure

her of a ‘uterine difficulty,’ as he termed it, she not being well, committed upon her a rape, as so decided by the Court of that State, and was accordingly punished. She became pregnant, and at term was delivered with instruments after a protracted and severe labor. Convalescence was slow, and she was still weak, when six months after the delivery she attended the Court at Brooklyn, at the trial of the physician. She took a severe cold, and on returning home was taken sick, Dec. 21, 1865. The case proved to be meningitis. The disease commenced with most violent pain in the head, over the eyes, extending to the top of the head, and finally to the back portion, and proceeding down the spine. This pain was most excruciating, causing the patient to shriek and scream violently. The patient soon became delirious, and spasms of the upper and lower extremities followed. The head was drawn back, with rigidity of the muscles of the body. There was no great degree of heat of the body ; the pulse rose to 110 to 115 ; respiration proportionally quickened. The tongue was red around the edges, with a yellowish fur in the middle ; the thirst quite considerable ; the eyes staring, the sclerotica tinged, and slightly yellow, as also the skin of the body. At intervals the pain in the head and back would slightly abate, and the delirium would pass off, but would again recur on the return of the pain. There was nausea, with tendency to vomiting.

“The treatment was first an active purge of calomel combined with opium, followed by black draught, sinapisms to the spine, cold upon the head. The action of the cathartic produced a large discharge of black fetid faeces, accompanied with a copious urinary discharge. In order to quiet the pain and allay the spasmotic tendency, full doses of morphine were administered, and counter-irritation applied to the spine. This was the treatment for the first few days. No abatement of the symptoms, excepting less delirium. On the third day pain less in the head ; less in the cervical, but more in the dorsal and lumbar portion of the spine, proceeding down the lower limbs, causing them to contract spasmatically. The pain also extended around the hips, through the bowels, and left side. There it was excruciating. The patient was obliged to lie on the right side, with the knees drawn up. She moaned bitterly. Pulse 110. Skin inclined to be cool and moist. Thirst slight, tongue dry and furred, edges looking red.

“*Treatment.* Small doses of calomel and opium, with full doses of morphine at intervals to allay the intense pain and

procure sleep: counter-irritation to the spine; hot fomentations on the side and bowels. On the fourth day the spots appeared upon the face, chest and upper part of the body. Pain more or less severe in the head and throughout the whole length of spine. The skin became very sensitive, and patient complained of prickling sensations, declaring that "worms were crawling over her." Could not bear the weight of the bed-clothes: continued to lie with the legs drawn up, and on the right side: very sensitive to the light and to sound, and could not endure the smell of the cooking arising from the kitchen. In fine, all the senses were exquisitely acute and sensitive. The bowels were again moved, the evacuations now yellow and less offensive. Urine somewhat scanty and high colored. Skin cool, some perspiration; pulse 95. As the bowels had been well moved, the calomel was discontinued, and as the morphine had failed to induce sleep or to allay the spasmodic tendency, I gave the tinct. Cannabis Indica, in 15 drop doses every four hours. The diet during this time was light, but nutritious. The pain was peculiar in its course. It would commence in the head, pass down the spine, thence around the side and bowels, producing the most intense agony, then suddenly leaving, run rapidly down the course of the sciatic or femoral nerve, and attack the heel or top of the foot, remaining awhile, then going over to the other foot, then up the leg, then up to the head—hopping about here and there all over the body. It was most piercing and violent, like neuralgia. At intervals, when the pain was less violent, the patient would sink into a state of stupor, the muscles of the throat and mouth become rigid, the jaws closed and firmly pressed together, the breathing slow and at last hardly perceptible. This state would continue for one or two (and once or twice it continued three) hours, when suddenly the patient would rouse up, look about, perhaps call for something to drink, and say she felt better. This would continue a short time, when the pain would come on, and the same exhibition of symptoms would take place. This stupor was not the effect of the Cannabis or morphine, for it came on all the same whether it was given or omitted. The action of the Cannabis seemed simply to control the pain and spasm. This treatment was followed up with cold and counter-irritation applied to the spine, and the patient gradually improved. At the end of three weeks she had so far recovered as to sit up long enough to have her bed changed. One day (Jan. 15, 1866), however, contrary to directions, she was induced, by the injudicious

advice of her friends, to have her clothes put on, and to 'move about a little, and thus get strength faster.' The consequence was that the 'getting up' was overdone and the patient undone. A relapse followed; all the symptoms returned with redoubled fury. The pain was excessive, and not only affected the head and spine, but every organ in the body. The skin and the sclerotic coat of the eye became of a dark yellow; the urine was almost black, and passed with the greatest suffering; great and constant nausea, with occasional vomiting of a dark colored fluid, set in.

"The pain in the bowels was intense, especially in the region of the bladder. The menses made their appearance, copious and very dark in color. Pain in head and back was less violent, but more in the side and bowels. The skin was inclined to be cold; pulse 78; appetite gone; tongue quite clean. *Treatment*—Cannabis continued, with quinine one to two grains every four hours; brandy, beef tea, &c. Cold was applied to the spine.

"The state of stupor became more prolonged, the strength holding out remarkably. Iron and the whole tonic and stimulating treatment was thoroughly carried out. This continued about a week, when the pain in the pelvic region became intense, the patient complaining of a weight, a 'bearing down.' A vaginal examination revealed nothing. No pain of the neck and substance of the womb and bladder, and yet the pain on passing water would cause the patient to cry out in agony. The bowels were moved in the mean time, producing copious dejections of dark-colored fæces. This state of things continued till the 20th day of February. The Cannabis had lost its power, and the different forms of narcotics were tried in succession. Different applications to the spine were used. Ergot was not tried, as I had seen it used in another case with not the least good effect whatever. The different alkaloids, strychnia, veratrine, &c. were all tried, and, so far as I could judge, not the least benefit was derived from anything of the kind. At this period the pain suddenly left the pelvic region, and attacked the chest and stomach with the same degree of violence. Pain in the head very much less; in the spine, about the same. Up to this time the patient had taken considerable food. Beef tea, gruel, toast, anything which she would eat, that was nutritious, was allowed. Now, Feb. 25th, commenced the exhibition of a different series of symptoms. Nausea commenced; pain in the stomach and chest increased; strength began to fail. Sufferings at times intense; stupor more frequent; finally vomiting

APPENDIX.

commenced. Skin of a deep, dark yellow ; petechiæ here and there ; urine dark brown, thick ; extremities feeling numb and cold ; pulse 70 ; tongue clean. The peculiar sensitiveness of the body gone. Could bear light and sound, but the sense of smell very acute ; cannot bear any smell of food, intense loathing of it. Pain in the chest and stomach intense. The fluid vomited was of a dark brown color, at times black, resembling, I should judge, that which is vomited in yellow fever. Nothing had the least effect in stopping this vomiting. Counter-irritation over the stomach, local application of any kind, seemed rather to increase it. Anything taken into the stomach would induce it. Its very presence in passing down the throat would bring it on. This vomiting continued for *twenty-seven days*, and during that time not a particle of food was retained on the stomach. During this time she would occasionally take a little warm gruel to enable her to vomit the more easily, but it would seem to be all returned. In order to allay the pain, and as all kinds of medicine taken by the mouth only aggravated the vomiting, I allowed her to inhale a few drops of chloroform. This gave her the only relief she got. While under its influence she would lie quietly, but as soon as it had passed away she would most piteously beg for more. At the end of the 14th of March she began to vomit a thick grumous substance, which on examination proved to be *blood*. In the course of two or three days the hæmatemesis was fully established, and at times she would vomit a pint or more of dark clotted blood, and at one time the nurse, a very intelligent person, estimated it to be not less than a quart. At this time nothing was retained on the stomach, and the idea of taking either food or medicine or any outward application, would induce the vomiting. Only the chloroform gave any relief. I tried nit. argenti with belladonna, also the sub-sulphite of soda ; in fine, everything which seemed likely to do good, but without avail. The mind at this time was remarkably clear and composed. No delirium, and the turns of stupor less frequent. About ten days before she died, blood began to ooze from the gums and lips, and finally from the chin and at the junction of the alæ of the nose and cheek, also from the forehead. It came also from the tips of the fingers of one of the hands. Dark purple spots appeared upon the body, and there seemed to be a purpuric condition of the whole system. She gradually sank, and death closed the scene of suffering, March 24th, 1866, the patient having been sick ninety-three days." * * *

By a misunderstanding on the part of the friends of the patient, Dr. Stickney lost the opportunity of making a post-mortem examination.

"The pathology and treatment of the malady, says Dr. Stickney, 'seem to me not as yet to be understood. I have seen some phases of it, I think, in a modified form, and in connection with the exhibition of other forms of disease, of which I can give myself no intelligent response, unless this disease is either at the bottom or in some obscure manner connected with them.'"

D.

The following cases are from the Records of the Boston Society for Medical Improvement (for 1866).

MAY 28th.—*Cerebro-spinal Meningitis*.—Dr. MORLAND reported the case, the following account of which is prepared from the record furnished by Dr. J. F. A. Adams, resident graduate in the Medical Department of the City Hospital.

G. W. T., twenty-eight years old, was admitted into the Boston City Hospital, May 24th, 1866, at 3 o'clock, P.M. He was at once seen and prescribed for by Dr. Adams. Very little of his previous history could be obtained. A friend, who came with him, stated that he was unmarried, and that, since he had known him—about two years—he had not been very strong, but that he was a quiet, temperate man. He was a dealer in photographs, and a resident of Boston. His father and a brother, it was stated, died of phthisis.

He was taken ill on May 20th, and is said to have been in a state of stupor during the first few days. Dr. George Derby, Admitting Physician to the Hospital, on first seeing him, supposed him to be intoxicated, but immediately discovering him to be very ill, sent him at once to the Hospital. On admission, he was almost completely unconscious, groaning and crying, as if in great pain, which, so far as could be ascertained, was in the head, and especially on the left side, and over the upper part of the forehead, upon which he constantly kept his hand. When aroused and asked if he felt pain elsewhere, he replied that he "did not know of any." The pupils were contracted, the pulse 68, very full, hard, and irregular. He was exceedingly restless. A slight sero-purulent, dark-colored discharge from the right ear was noticed. A sinalism was applied to the back of the neck, and a scruple of the

bromide of potassium was administered. At 7 o'clock, P.M., large sinapisms were applied to the calves of the legs, and the dose of bromide was repeated, and continued, every two hours, through the night. During the evening, six leeches were applied behind each ear, and the bleeding was very free after their removal. The urine was drawn off by the catheter, and was of a very dark, coffee color. The pulse rose to one hundred after the leeching, and became softer and more regular, but was still very variable. The pupils were then observed to be dilated, and they remained so. A few dark-colored, minute spots, not fading on pressure, were observed upon the chest.

The patient was seen by Dr. Morland about 10 o'clock next morning, May 25th. The pulse was then 120, and exceedingly small and weak: there was some sordes upon the teeth; the spots upon the chest were the same. The bowels had not moved since admission. A warm salt-and-water enema was directed; also an ice-bag to the head, and wine and water, freely. The patient was exhausted, and very restless during the entire day, crying and moaning, as if in pain, and quite unconscious. The enema produced a free evacuation of dark-colored faecal matters. The urine passed involuntarily. Gruel was swallowed without much difficulty. In the afternoon, the pulse was weaker and exceedingly irregular—varying from 80 to 160, within a few minutes, and almost without rhythm. A vapor-bath was used, in bed, and a tolerably free diaphoresis was obtained. The patient became more quiet after the bath, and the pulse was 152, full, soft and regular. The relief, however, was only temporary, and he continued in his previous condition, with the exception of increasing weakness, until 4 o'clock the next morning, when he died, about 37 hours after admission.

The nurse stated that she had observed convulsions, of short duration, but it could not be positively determined whether these were any thing more than the violent jactitations which were constantly present. There was certainly no opisthotonus.

On examination of the urine, *albumen* was found to be abundant, and the microscope revealed *granular casts* and *pus-cells*. *Urea* could not be detected.

In reference to the *diagnosis*, it was not easy to make a decision. Typhoid fever was suggested by the stupor, the sordes and the general condition. The spots upon the chest were not "rose-spots," nor were they of a purpuric nature. The somewhat dubious report as to the occurrence of convul-

sions, in connection with the results of the examination of the urine, suggested uræmia. It is fair to add, that, although cerebro-spinal meningitis was mentioned, in this connection, no positive diagnosis was made. The account of the *post-mortem* examination, which was made by Dr. C. W. Swan, Pathologist to the Hospital, is appended. The specimen was shown to the Society by Dr. Swan.

Autopsy.—May 27th, 9 A.M.—Membranes of the brain rather dry. A sub-arachnoid deposit of opaque, yellowish fibrin over the upper and anterior parts of each hemisphere, particularly towards the median line—at the base of the brain, extending into the various fissures, and upon the superior and cuneiform process of the cerebellum.

The whole length of the spinal cord was enveloped in a similar deposit, which was, however, less in amount towards the upper extremity than elsewhere. *Lungs* pale, healthy. *Liver* and *kidneys* rather dark. The *stomach* was distended with gases, and contained bright, olive-green fluid in large quantity. The *heart* was firm. Fibrinous coagula in both sides. Right auricle and *vena cava* distended by soft black coagula. About half an ounce of serum in the pericardium.

Dr. H. K. OLIVER said he saw this patient previous to his application for admission to the City Hospital. The first day of his illness great complaint was made of pain in one of the ears, the membrana tympani of which was much congested : the next day there was a great discharge of pus with a little blood from the same ear ; there were then no symptoms of meningitis.

Dr. JACKSON suggested that in this case the inflammation might have extended from the ear to the membranes of the brain. He said this might take place though the bone intervening was perfectly healthy, and instanced several cases of the kind which had come under his observation.

Dr. OLIVER said the same idea had occurred to him.

JUNE 11th.—*Cerebro-spinal Meningitis ; Death ; Autopsy.*—Dr. BLAKE reported the case.

Miss L. R., 26 years old, was admitted to the City Hospital June 2d. For a year has had otorrhœa, with deafness, for which she has been treated by an irregular practitioner, by means of injections, &c., without relief. Five days ago, the present trouble commenced, with headache, confusion of thought, and a feeling of general *malaise*. Two days after, she was obliged to keep her room, had pain in her back, weakness of knees, and a good deal of febrile action. Was

seen by a physician, who, after an examination of her case, thought her symptoms indicated commencing varioloid. During the evening of this day, she first noticed pain and stiffness of the posterior cervical muscles, and shortly afterwards was seized with severe cephalgia, loss of consciousness to some degree, slight strabismus and opisthotonus, and had remained in that condition up to the time of entrance.

On admission, the opisthotonus was found very well marked—head thrown back, body arched, legs stiff, &c.—almost wholly unconscious; mouth partly open, *and lips covered with little herpetic vesicles*; eyes half closed, with moderately dilated and sensitive pupils; respiration labored and noisy, 32; pulse 120, regular; tongue dry and brownish; sordes on teeth. A number of dark, purplish-looking spots, one eighth of an inch in diameter, noticed on chest, neck and arms; spots not raised, do not disappear on pressure.

Leeches behind ears, ice to head, and bromide of potassium, in large doses, were prescribed. Liquid nourishment by rectum, if unable to swallow. Next day, the opisthotonus had disappeared, but the cervical muscles continued rigid; she could swallow liquids without much difficulty; pulse had come down to 90; pupils somewhat dilated and sensitive; still unconscious; faeces and urine passed involuntarily.

The following day she was in about the same state—respiration and pulse a little quickened; rigidity of muscles as marked; no return of consciousness. Next day she died. The following is the report of the *post-mortem* examination, as made by Dr. Swan.

Examination, 10 hours after Death.—Head. The large vessels of the pia mater, on the upper surfaces of both hemispheres, particularly about the vertex, were turgid with blood, and the minute vessels lying on the convolutions were unusually distinct. There was a sub-arachnoid deposit of soft, greenish-yellow lymph in many places on the upper surfaces of the hemispheres, at and between their anterior extremities, in the fissures of Silvius, at the optic commissure, on the pons Varolii at the anterior edge of the cerebellum, and on its superior vermicular process. Lying free upon that portion of the dura mater which covers the upper surface of the right hemisphere, was a continuous, uniform layer of lymph two or three square inches in extent. A less amount, in small, scattered particles, occurred upon corresponding portions of the left side. There was no excess of fluid in the serous cavities of the brain or cord: the brain-substance was firm; the puncta cruenta large.

Beginning five inches from the upper extremity of the spinal cord and extending downward about seven inches, was a thick, unbroken deposit of soft, pale, greenish-yellow lymph. It was entirely confined to the anterior aspect. On the posterior surface, the minute vessels seemed slightly injected, but there was no trace of lymph.

In the left pleural cavity, ten ounces of a turbid brownish liquid, sustaining fat globules on its surface. The two principal pulmonary veins of the left lung, and the left primary and two secondary bronchi, were laid bare to the extent of one or two inches, and several venous branchlets were completely isolated for an inch, more or less, by a curious superficial progressive waste of the parenchyma of the lung. This process was most marked on the inner surface of the lower lobe, but it had invaded a portion of the upper lobe nearest its roots and had also extended between the two lobes. It had destroyed at least the pulmonary pleura in its course, the line of demarkation being in general easily made out, but there was also undoubted loss of proper lung tissue towards the centre of the diseased action, although the finger found no deep cavities. The bare parenchyma presented a rather smooth, lobulated surface of a deep brown color. There was little or no odor about the parts. The posterior and upper surface of the lower lobe showed small hæmorrhagic blotches beneath the pleura. Section showed considerable lobular pneumonia. The same disease, to less extent, existed in the right lower lobe. Rest of lungs healthy. Other organs normal.

E.

In addition to the few cases given above as having occurred in 1866, we have seen it stated that "spotted fever" invaded, during the early part of the present year, the Seminary in Pittsfield, which suffered from an endemic of typhoid fever a few years since. Of the cases in this recent invasion of Pittsfield we have not been so fortunate as to obtain details.

Of course we have not sufficient data to enable us to say whether or not "spotted fever or cerebro-spinal meningitis" continues to prevail as an epidemic in this State.

F.

Doubt has been entertained as to the true nature of the endemic denominated "typhoid" in the preceding paragraph, and mentioned as occurring at the Seminary in Pittsfield. That endemic is the one referred to by Dr. C. E. Ware under the head of "Contagion," in table E.

PUBLICATIONS
OF THE
MASSACHUSETTS MEDICAL SOCIETY.

VOL. II.—NO. II.
737.20

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BY J. M. TONER, M.D.
OF WASHINGTON, D. C.

Cases of Trichina Spiralis in Springfield.

BY M. CALKINS, M.D.
OF SPRINGFIELD.

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BY JOHN HOMANS, JR., M.D.
OF BOSTON.

BOSTON:

PRINTED BY DAVID CLAPP & SON.....334 WASHINGTON ST.
MEDICAL AND SURGICAL JOURNAL OFFICE.

1867.

HISTORY OF
INOCULATION IN MASSACHUSETTS.

BY J. M. TONER, M.D.
OF WASHINGTON, D. C.

THE following chapters on Inoculation contain that portion of the general history of Inoculation for the smallpox in America which relates particularly to Massachusetts. This portion is taken from its place in a prepared but unpublished "History of Inoculation in America," and is offered to the Massachusetts Medical Society for publication in their Transactions, by

THE AUTHOR.

CHAPTER I.

American Colonies—Rev. Cotton Mather—Royal Society's Transactions—Smallpox epidemic in Boston—Inoculation suggested—Great opposition to Dr. Z. Boylston, the first inoculator—Rev. Cotton Mather—Rev. Increase Mather—Their great influence—Sketch of Dr. Boylston—His first inoculations—Numerous cases follow—Old and new styles—Results of inoculation—Statistics of the casual disease—Great distress among the poor—Mortality of the casual and inoculated disease—Mode of operating changed—Opposition to the practice—Dr. Boylston's character.

WHILE Inoculation was slowly fighting its way to favor in England, and achieving a victory for the whole continent, events of equal interest were transpiring in the American colonies. Boston, then the chief commercial emporium of the new world, had a population of some 12,000 inhabitants, who were already distinguished for their intelligence and thrift. But the pulsations of trade and enterprise which throbbed through Boston from the great heart of London were feeble, though healthy. Communication with the old world was slow and infrequent, and the excitement and sensations of the populous cities of Europe were not felt in the colonies till long after they had expended their force, if indeed they were felt here at all. Hence it was that while the people in America were yet ignorant of the inoculation movement in England, they were engaged in making very similar experiments, but on a much more extensive scale.

It seems to be quite clear that the commencement of the practice in Boston was not at all dependent on events which had taken place in England. The published papers of the Royal Society found their way naturally enough to the more intelligent circles on this continent, and the letters of Timoni and Pylorini, published in 1714–15, upon the subject of inoculation as practised in Turkey, were regarded as so

curious that Dr. Douglas, who was in receipt of copies, called the attention of the Rev. Cotton Mather to them, and lent him the numbers of the "Transactions" in which they were published. (See Note 1.) Mather was then a young man just rising into notoriety, and the idea of mastering smallpox by the novel practice of the Byzantine inoculation, seized hold of his earnest nature in a way not to be shaken off; and shortly after there was a concurrence of circumstances eminently calculated to call into practical service the faith which the articles alluded to had inspired.

It will be remembered that the first inoculation in England was that of Lady Mary Wortley Montague's daughter, which took place in April, 1721. During the same month, and while the young and noble patient was yet under the effects of the disease thus artificially induced, some vessels arrived in Boston from Saltortuga, with smallpox on board (Note 2), whence it was communicated to the people of the town, and raged for many months, causing the most fearful mortality.

But it was not a new or a strange visitant. (Note 3.) It had been there before; and although it was nineteen years since (Note 4) it had prevailed as an epidemic, the old inhabitants retained a vivid recollection of its ravages, which had not been confined alone to the European settlers, but extended to the Indians, among whom it was even more destructive to life than among the white population.

As soon as the smallpox appeared as a decided epidemic in Boston, the Rev. Cotton Mather, fresh from his reading of Timoni and Pylorini, was very earnest for making instant trial of the Turkish remedy, confidently hoping by this means to protect the people against the severity of the disease. To this end he had made copies of the articles on the subject in the Philosophical Transactions, and caused them, accompanied by an urgent letter from himself in favor of the practice, to be laid before every practising physician in the town, thinking that they would at once seize on the idea and put it into immediate practice.

But the "vain preacher," as Dr. Douglas calls him, had judged others too much by himself, so that, with a solitary exception, his good and timely advice fell upon perverse sensibilities, and produced no favorable response. (Note 5.)

One physician alone of all the practitioners in Boston was impressed with the full importance of the proposed remedy, and determined to give it a trial. This was Dr. Boylston (Note 6), a man of fair ability and extensive experience in his profession, who had suffered much in his own person from smallpox, and witnessed its ravages nineteen years before, when it swept off great numbers of his friends in town and country. He possessed enlarged views of professional duty, great moral courage, and an experience with the disease which enabled him to take heavy responsibilities. He was encouraged the more to make trial of inoculation from the impotency of all the remedies then known to the profession, none of which could either control the severity of the disease or give an encouraging promise of recovery. He had for his personal friend the Rev. Cotton Mather (Note 7), a zealous advocate of the practice, and who was in a position to render him a powerful support.

Perhaps no name in the early history of New England is more conspicuous than that of Cotton Mather. The son of one of the most distinguished religious teachers in America, generously endowed, well educated, of an active and vigorous temperament and high moral organization, he was, besides, a fluent and voluminous writer, a popular preacher, and not at all disposed to shrink from any contest which circumstances might thrust upon him. He was the first upon this side of the Atlantic to be favorably impressed with the idea of inoculation as a remedy against the fearful ravages of the casual smallpox, and was not only the first but the ablest and most efficient advocate of that innovation in America. Indeed it was his zeal and energy which inaugurated the movement, and, combined with his great influence, which

pushed it on to ultimate triumph. He was, however, generously sustained by his father, the Rev. Increase Mather (Note 8), then in the zenith of his strength and popularity, and by so large a portion of the clergy (Note 9) that the newspaper scribblers of the day turned the tables on them by representing that the contest so long waged about inoculation was a matter of difference between them and the people. (Note 10.)

The articles which Rev. Dr. Mather caused to be copied from the Philosophical Transactions were distributed on the 6th of June, 1721, and on the 26th of the same month Dr. Boylston performed the first inoculation. (Note 11.) Like Lady Mary Wortley Montague, he showed his strong faith in the remedy by first trying it on his own son, and then on two of his negro servants. The mildness of the disease by inoculation, and the satisfactory termination of the cases, gave him the assurance which he needed to justify a recommendation of the practice to his patients, and, surprising as it may seem, he actually inoculated, from the 26th of June, 1721, to the end of January, 1722, 244 persons. (Note 12.)

A letter to Dr. Jurin, Secretary of the Royal Society, from the Rev. Cotton Mather, bearing date March 10th, 1721, estimates that there had been inoculated in and around Boston 300 cases, out of which five, or at most six, died. Dr. Mather in his dates must have conformed to the old style (Note 13), while most historians alluding to the event used the new, for the disease, as we have noted, did not appear in Boston until April, 1721, new style; March, according to that computation, having already passed. These inoculations were made on all sorts of persons, without that discrimination in regard to the patient's habit of body, his freedom from disease, or his advanced age, which a fuller experience showed to be necessary. We need hardly say, therefore, that where the disease was prevailing with such malignancy there were some deaths. Of the 282 inoculations,

274 had the disease favorably, 6 were unaffected, and 6 were supposed to have died of it. The first death was in the latter part of September, a Mrs. Dixwell, aged 37, very fat, and of a feeble constitution. She died on the seventeenth day of the eruption. The second, John White, Esq., died in December. He was of a weak and sickly constitution, and died on the twelfth day of the eruption. An Indian girl of 17 was the third fatal case. The fourth was Bethiah Scarborough, a widow, of bad constitution, 67 years old; she died before the pock came out. The fifth was a Mrs. Wells, aged 54, a sickly, splenetic woman, and, as the doctor observes, "often deprived of reason, and for many years not capable of managing her affairs." She died on the ninth day of the eruption, having suffered greatly from the cold weather. Mrs. Serle, aged 61, was inoculated at the same time, and was also a delicate, hysterical woman, and of an ill habit of body. The disease was of a mild type, but after the scabs fell off she was seized with an inflammation of the bowels, and died on the twenty-fourth day of the eruption.

Besides the 244 inoculations by Dr. Boylston set down in the table, two others were performed by him after it was printed off, and Drs. Roby and Thompson had inoculated successfully 36 in Roxbury and Cambridge; so that the whole number that acquired the disease was 276, six remaining unaffected. It thus appears that notwithstanding these promiscuous and haphazard inoculations, made mostly as experiments, certainly without experience, only one person in forty-seven fell a sacrifice to the disease. But it was contended by the friends of the practice, and with a probability of truth, that at least two of the deaths resulted from causes not connected with induced smallpox. The result was not so flattering as had been hoped for by the more sanguine friends of the measure, but it made, nevertheless, a much better exhibit of the saving of life than that presented by the Board of Selectmen in their report of casual cases after

carefully gathering the statistics of the disease, which for nearly a year had been making sad havoc among the inhabitants of Boston and its immediate vicinity.

From this report, a summary of which is preserved in the Massachusetts Historical Collections, it appears that in and about Boston, with its population of 12,000 souls, there were 5,989 cases of smallpox, including the inoculations. If we make allowance for the removal of families to other places to avoid the contagion, this number must have considerably exceeded one-half of the whole population liable to the disease. Of these 5,989 cases, 844 died (Note 14), which is one death in about every seven attacked, while in the disease acquired by inoculation there was at most not more than one death to forty-seven cases. (Note 15.)

During the entire prevalence of the disease many families continued to reside out of town, and of those who remained large numbers were protected by reason of having had smallpox previously. In view of all the facts, the report gives about 700 as the number of persons who, not having had the disease, were proof against it, notwithstanding their continued exposure to the contagion. From these figures it would seem that the disease ran riot over the town, feasting on all who were susceptible to its poison, and continuing its ravages upon beauty and life so long as it had material to feed upon, and subsiding at last simply because the supply of victims was exhausted.

The comparative results between the mortality attending the inoculated and the casual smallpox, as obtained by an actual census, was not spread before the public until long after the storm of violent opposition and blind passion had subsided; but it eventually formed the basis of a sound and intelligent public opinion in favor of the practice of inoculation, which ultimately grew into public favor.

It could not be otherwise than that there should have been many instances of great destitution and suffering among the

poor for the want of the comforts and necessaries of life, almost quarantined and cut off through fear from their accustomed country supplies during the prevalence of an epidemic of such unusual severity and duration as was that of 1721. The panic became so general as to arrest work on public and private improvements, day laborers and mechanics of all kinds were without employment, and consequently their ordinary means of earning support were taken from them. Business of all kinds was greatly interrupted or actually suspended. From sickness and the suspension of income, with the extraordinary expenses required, the well-to-do were made poor, and the poor impoverished to the last degree. But the destitute of Boston in their hour of need were not neglected; they received sympathy and generous succor both from their own corporation and from surrounding places, as instanced by the prompt and liberal contribution (Note 16) from the town of Scituate, Plymouth County, Massachusetts, distant about twenty-eight miles from Boston.

Inoculation was not permitted to go on smoothly, and to accomplish even the small saving of life it did, without exhibitions of the most passionate and violent opposition. Its authors were persecuted, personally abused and insulted, arraigned before the civil authorities, and held up to reprobation in the newspapers, and in every possible way made to feel the wrath of an offended community. But much valuable experience had been gained, and many important facts collected bearing upon the amelioration of the suffering from this disease, which were published and made a strong impression upon the public mind. Formerly there had been no security but in flight, but the inoculation movement awakened in the hearts of the people a hope that medical science, under Providence, might devise some means of mitigating its severity. At first Dr. Boylston performed the operation according to the mode described by Timoni, but

so bold an experimenter could not long be confined to a practice so cumbrous and unprofessional. He says: "The Turkey mode of scarifying and applying the nut shell, &c., I soon left off, and made an incision through the true skin and applied the plaster over it, which I have found since to be the better way."

He also dropped the practice of inoculating in several different parts of the body. The prolonged illness and ultimate death of the few who died of smallpox acquired by inoculation taught also a lesson, and the greater caution, with the more careful discrimination of suitable subjects, secured more fortunate results in after practice. Dr. Boylston, by his close observation, discovered the important fact that smallpox taken by inoculation will develope itself four or five days earlier than when the disease is taken by contagion in the casual way, and may therefore be made to supersede the latter and divest it of some of its dangers. The discovery of this important law in the development of the disease has been claimed by others, but is justly due to our American inoculator. (Note 17.)

But the New England operators eventually fell into the same error which the profession of Europe did, of making large and deep incisions so as to secure a plentiful discharge of matter. This was done in consequence of the humoral pathology controlling largely the opinions of the profession in this country as well as in Europe. This cruel mode caused much unnecessary suffering and generally retarded recoveries, and not unfrequently entailed permanent lameness.

Inoculation in the colonies, as also in Great Britain, did not triumph at once, but had to fight its way little by little through more or less opposition for many years. But the battle which decided the fate of the new remedy in America was fought over the inoculation of 1721 by Dr. Boylston.

How severe that contest was, we will endeavor to show in

the next chapter. Meantime we pause a moment to express our admiration for the man whose faith in his own skill and ability to relieve human suffering was stronger than his fear of opprobrium or persecution, and who, amid public and private censure, adverse official action, and professional opposition, continued his philanthropic work, and in the face of the severest discouragements pushed forward with confidence in his experimental cases until he had accumulated a store of facts which fully vindicated his judgment and called down upon his head the blessings of his countrymen.

In England inoculation was introduced at first among the most elevated in society. Accidental circumstances soon took it thence into the court circle, the King giving it his royal sanction. But notwithstanding these great advantages, the profession did not advance to an enthusiastic advocacy of it, but were rather led forward in the matter by the people. Even the first operators there were timorous and hesitating to a remarkable degree.

The idea that it was borrowed from the lazzaroni staggered and dampened their ardor, and they did not put into their advocacy enough enthusiasm to carry it with any momentum into the stolid ranks of a conservative public opinion. The conduct of Dr. Boylston contrasts admirably with this temporizing spirit. He threw himself into his work with the earnestness and zeal of a man who had faith; and while the English doctors were halting and trying experiments on condemned convicts and the children of charity schools, he recommended the practice to the whole circle of his friends. He also sealed his faith in the remedy by applying it to his own family, and in a short time gave to the world the record of the recovery of two hundred and eighty-two cases, with facts and figures which stamped it a successful mode of practice in combating the mortality of the casual smallpox on this continent.

CHAPTER II.

Friends of inoculation in Boston—Great opposition to the measure—The Doctors generally oppose it—Malevolence of the opposition—Dr. Boylston perseveres—Controversies—The practice conducted secretly—Attempt to destroy Dr. Mather's house—Dr. Boylston brought before the authorities—Controversy of the clergy with Franklin—Dr. Douglas and his hostility—The Selectmen also interfere—Violence against Dr. Boylston attempted—His escape—The practice gains confidence.

IN looking back on the efforts of Rev. Cotton Mather to enlist the medical profession of Boston in behalf of inoculation, his course will generally be regarded as prudent and wise, and well calculated to attain the end which he had in view. If the doctors had consented and acted in concert in giving the new remedy a fair trial, it is easy to see that they would have so strengthened the moral influence of each other, and so affected the sentiment of the community, that the few unfortunate cases which had occurred would not have poisoned the public mind or aroused the popular prejudice against the measure. And at the same time the independent but harmonious action of the different practitioners in their various circles and under diverse circumstances would have soon furnished evidence of the best modes of inoculation and after-treatment, and given an amount of practical experience which would have inspired confidence and almost disarmed opposition, abridged the period of trial, and hastened the day of triumph, to say nothing of the hundreds of lives that it would have saved.

But, on the other hand, the effort to harmonize the practice having failed, it greatly aggravated the difficulties of any one who might venture to make the experiment. The step taken in this direction by Dr. Boylston naturally enough caused the rest of the profession to look upon him as a dis-

senter, as his action in the matter was a standing censure upon their hesitation or want of judgment. They had virtually rejected the Turkish remedy; he had accepted it. Their conduct implied want of confidence in it; his implied the utmost faith. They had stood aloof; he had advanced and embraced it. Hence professional jealousies were aroused, and there was a general desire that the experiment might fail in his hands. This feeling strengthened among the doctors as he boldly multiplied his cases; and the feeling was soon communicated to others, and finally spread among the masses, and seemed to take possession for the time of the great popular mind. It was most fortunate, therefore, in view of this state of feeling, that no death occurred among those inoculated till three months of experience had shown how generally mild and safe the inoculated disease was.

A spirit of bitter opposition to the new practice was manifested from the first inoculation, and it was very evident that the doctors were not indifferent spectators of passing events. Society was so excited and alarmed by the presence of a loathsome disease in its midst, that, although ready to fly to almost any remedy which promised even a moderate chance of protection, it was nevertheless so undecided by the various rumors, doubts and fears circulating that it required the strong personal influence of Dr. Boylston and his compeers to persuade persons to submit to inoculation. Doubts were raised respecting its safety, its genuineness, its power of protection against future attack, and especially as to the propriety of inducing by artificial means a disease which was already so fearfully widespread and destructive to life, and when it was found that a death had actually resulted from inoculation, the opposition broke out into a systematic denunciation of the practice and a vigorous persecution of its advocates. The friends of the Byzantine practice were squibbed in the newspapers, insulted in the streets, subjected

to personal abuse, and made to feel in every way that they had outraged the feelings and wishes of the community.

But the Mathers were strong in the confidence of the public, and they did not falter in their support of the measure for a moment. Most of the clergy were with them in their approval, and became a powerful shield to Dr. Boylston, who persevered in the practice, with an unwavering faith in its utility and general safety, in the very face of this aroused and maddened public sentiment. To make matters worse, James Franklin, just prior to this, had started his "Courant" in opposition to the "News Letter." The latter was a weekly paper, patronized by the merchants, clergy and the more respectable classes, while the former was left, naturally enough, to gather around it those who had at one time and another been repelled from this select circle, and among the rest were the doctors who felt Dr. Boylston's course to be a severe reflection upon them, and who were consequently chagrined at the apparent success which was following his novel innovation. The controversy, therefore, not only got into the newspapers, but took a sharp, acrimonious, and personal turn, so that the new remedy and its friends formed for a time the leading topic of popular excitement for the press. The "Courant" made it a point to attack any and everything that was of consequence enough to make a sensation, and on this subject had the popular approval, though it was in bad repute with the officers of the crown, and was finally suppressed by the strong hand of the Governor. The clergy of course came in at an early period for a share of its abuse, and on the 28th of August a correspondent of the "News Letter," understood to be one of the Mathers, gave it a very uncomplimentary notice, which is significant, in this connection, chiefly on account of its allusions to the doctors. (See Note 18.)

The disposition of the "flagitious and wicked" "Courant," as it was called in the "News Letter," was not at all soften-

ed towards the clergy by this attempt to lower its character through the columns of the rival paper, and the Mathers were attacked by name and unmercifully squibbed and ridiculed for a period of many weeks, mainly on the ground of their defence of inoculation. And when, in the latter part of September, 1721, the first death occurred among the inoculated, the writers in the "Courant" turned all their batteries of wit and sarcasm against the advocates of the practice, not only annoying them individually, but greatly stimulating and maddening public sentiment against them, already exasperated to a point little short of outrage and summary vengeance.

One of the fruits of this exasperated state of feeling was an order passed at a town meeting (Note 19) held on the 4th of November, prohibiting any person from coming to Boston to be inoculated, and providing that all inoculated persons should be removed to the pest house.

This order put the inoculators on their guard, and much of the work had to be done in a quiet or secret manner. Rev. Mr. Walter, the minister at Roxbury, who was a nephew of Dr. Cotton Mather, came over to Boston and was inoculated at the Rev. Dr.'s house, where he remained to be cared for during his sickness. By some means this fact got to be known beyond the family circle, and some malicious person, who may have had private griefs to revenge, in addition to the violation of the order upon the subject of inoculation, made this pretext, and having prepared himself with a grenade shell filled with explosive materials, and armed with a lighted fuze so arranged as to set it off at the proper moment, came to the house about three o'clock in the morning and threw it into the chamber where the reverend patient was lodged. (Note 20.) This was some ten days after the order of the town meeting; and while it shows that the public feeling was greatly exasperated, it also shows that the authorities, who must have known of the inoculation of

Rev. Mr. Walter, took no care to encroach on the privacy of the Rev. Cotton Mather, or to put the order in force against his kinsman. Fortunately for the lives of the inmates of the house, and for the peace of the community, the fuze was knocked out in falling on the floor, and the terrible engine of destruction failed to explode.*

But while the opposing elements were very violent among the ignorant, and the poor and needy members of society, there soon began to be a noticeable hesitancy in the more intelligent circles, probably arising from a shadowy conviction that after all their prejudice against inoculation it might prove to be a practice worthy of serious attention. Dr. Boylston was everywhere known as the professional head and leader of the offensive practice, and was several times brought up before official bodies and examined as to the facts which were being developed in his practice. But these examinations, instead of being an injury to the cause, were possibly in the end an advantage. The calumnies which he was thus enabled to refute, and the facts and results to which he pointed in verification of his assertions, were all strongly in favor of inoculation, and though not fully believed, his candor and willingness for an open investigation were shown by the repeated invitations he extended to the profession and the authorities to visit his patients and judge for themselves. Although these invitations were never accepted, yet their effect was not entirely lost upon the authorities.

The Selectmen of Boston, an official body analogous to the "Supervisors" of New York, or the "chosen freeholders" of some other States, as the guardians of the people, thought it their duty to meddle largely in the matter of inoculation, and seem to have acted pretty uniformly against the practice. Among their absurd acts of bias and prejudice was the publication of an affidavit made by Dr. Dalhonde,

* See *Hutchinson's History of Massachusetts Bay*, vol. 2, p. 275.

formerly a surgeon in the French army, who had travelled largely and was particularly bitter against the inoculators. His plausible story was well calculated to destroy all confidence in the new remedy. The doctors opposing the practice seem to have induced him to make a statement on oath of his personal experience with the practice, before two magistrates, and then they adroitly got the Selectmen to assume the responsibility and take the odium of making it public. This appears from the certificate of Dr. Douglas, who, in giving the translation, says:

“Boston, July 22, 1721. The foregoing is a true translation from the declaration made in French, by Dr. Dalhonde, *done at the instance and request of the Selectmen of the town of Boston.*”

The certificate of genuineness is signed, as witnesses, by William Douglas and Jas. Marion; also by the Justices of the Peace, Tim. Clark and W. Wellstead.

It will be observed that the date of this affidavit is nearly one month after Dr. Boylston began his inoculations. The Selectmen immediately published the document as a true statement, circulating it extensively throughout New England, and sent many copies to Great Britain, where it was re-published, to prejudice opinion there against the practice. Although the truth of the statement was suspected, it was impossible to contradict the base fabrication (Note 21), as time proved it to be. It is not to be wondered at, that under the persistent misrepresentations of the press and such outrageous perjuries as that contained in the affidavit referred to, Dr. Boylston should have been called before the town authorities and peremptorily ordered to discontinue the practice of inoculating for the smallpox. (Note 22.) The utter want of truthfulness in Dr. Dalhonde’s statement will be manifest to any person who will reflect that there was no inoculation known to the profession in Europe earlier than that of the daughter of Lady Mary Wortley Montague, in 1721.

But even this hostile demonstration on the part of the officials did not cause the doctor to abandon his philanthropic work. The practice had to be conducted more secretly, and this action of the authorities no doubt prevented many from availing themselves of the security which the inoculated disease gave of having it in a mild form, leaving them to the chance of the casual disease, and lessening the number who would have availed themselves of it.

Cautious and unobtrusive as he was in his practice, he was greatly annoyed and persecuted (Note 23) and hampered in his work, but his friends came boldly to his support, and encouraged (Note 24) him to continue a practice that was daily manifesting its advantages over all others known to the profession. Many of the clergy made use of their position as ministers, and from the pulpit recommended inoculation as safe and warrantable, and replied to the scurrilous attacks upon themselves and the practice in the "Courant," and to the anonymous pamphlets (Note 25) which had teemed from the English press and found their way across the Atlantic. About this period several ministers preached and published (Note 26) argumentative sermons showing that the practice was in accordance with the teachings of revelation.

The "Courant" continued its attacks, and was a thorn in the side of the inoculators, to which they seemed very sensitive. Franklin, the publisher, an elder brother of the celebrated Dr. Benjamin Franklin (Note 27), says, in his paper of December 4, 1721, that about three weeks before, he met a certain gentleman in the street, who, with an air of great displeasure, addressed him in threatening and denunciatory terms for opposing inoculation and confuting the arguments of the ministers. This bellicose conversation did not disarm Franklin or convince him of the sinfulness of his ways. The publisher of the "flagitious and wicked Courant" was not to be intimidated by any such threats of ce-

lestial vengeance (Note 28), and he tells his readers that he has thus been held up to public odium because he had answered "a piece in the 'Gazette' of October 30th, wherein the greater part of the town are represented as unaccountable liars and self-destroyers, for opposing the practice of inoculation." And further says, that the people were so exasperated about it that "at a town meeting soon after, they moved that a committee might be appointed to find out the author."

We must infer from these inklings of the controversy that the blows were not all on one side, and the battle, so far as it consisted in words, was pretty fairly brought out by both parties. The editor of the "Courant" got into disfavor with the government in 1722, his business fell off, his paper lost support and influence, and shortly after it passed from under his control.

It must be remembered that the temper of the age in which these incidents transpired was coarse, and that the theology of the people was intensely predestinarian. The Mathers and most of the leading ministers of Boston who were the pulpit organs of this theology were too practical and too well informed to push their abstract religious theories to their natural conclusions; but others were more persistently logical, and stoutly maintained that as every man had an appointed time to live on earth, it was only vain presumption to search for means by which to turn aside the Divine decree or avert the fell destroyer. It was maintained in the pulpit that the smallpox was a judgment sent of God, as a punishment for the sins of the people, and it was not extraordinary that the people should infer temerity and wrong-doing in an attempt to turn away the punishment by inoculation.

They maintained, naturally enough, that to put aside God's chastisements would only offend Him the more. It was declared from the pulpit that it was the right of God to

smite and afflict and chasten. It was said in reply by some, that if it was a measure of Divine justice to send smallpox to afflict man for his disobedience, it was therefore impious to interfere between the Creator and his creature by inoculation and such like inventions. Others saw in the multiplying of smallpox by artificial means a wilful tampering with death, and believed that if a patient died from the effects of the disease so induced, the inoculator should be held responsible for murder.

Popular opinion and independence of action on the part of the people was more emancipated from the governing influence of the clergy by the inoculation controversy than anything that had ever occurred in the colony. So much did the ministers feel this to be the fact, that during the year 1722 they felt called upon to publish a vindication (Note 29) of their course in recommending the practice. This document is couched in more becoming language than had generally been used in these discussions, and their course seems to have been just and humane throughout. With the cessation of the disease the masses became indifferent about the points of honor, and therefore no further controversy was evoked by this document.

Throughout this whole controversy it is shown that when men's passions are aroused, either side can justify its course by specious arguments. But it is probable, after all, that the animus of this portentous and threatening opposition existed chiefly in consequence of the encouragement given to it by the opposing doctors. It is pretty evident that they all disapproved of the course of Dr. Boylston at the start, though some treated him with fairness and a few were speedily made converts to the practice. (Note 30.) But others remained uncompromising and exceedingly bitter. The oath of Dr. Dalhonde is a sufficient evidence of his feeling towards an associate practitioner. But Dr. Douglas was scarcely less violent, and was more able and polished in his opposition.

Hutchinson says: "Dr. Douglas made the most zealous opposition. He had been regularly bred in Scotland; was assuming even to arrogance, and, in several fugitive pieces which he published, treated all who differed from him with contempt. He was credulous, and easily believed idle reports concerning persons who, having received the small-pox by inoculation, had afterwards taken it a second time in the natural way; of others who perished in a most deplorable manner from the corrupt matter which had so infected the mass of blood as to render the patient incurable.*

The partisan and prejudiced conduct of the Selectmen has already been alluded to; but they did not stop with the contemptible perjury of Dr. Dalhonde. At a subsequent period the justices of the peace and the Selectmen had a joint meeting (probably at the instance of Dr. Douglas and his associates). This meeting summoned before them the practising physicians of the town, who, under the excitement of the moment, but, as they say, after "mature deliberation," agreed upon a bulletin, which was afterwards put before the public in the following words:

"It appears by numerous instances that inoculation has proved the death of many persons soon after the operation, and has brought distempers upon many others which in the end have proved deadly to them. That the natural tendency of infusing such malignant filth into the mass of blood is to corrupt and putrify it; and, if there be not a sufficient discharge of the malignancy by the place of incession or elsewhere, it lays a foundation for many dangerous diseases."

It is no wonder that such scheming, persistent alarmists should have succeeded in arousing the popular indignation against Dr. Boylston. His position for a considerable time, in consequence, was one of great peril. Thatcher tells us that the enraged populace at one time were bent on his de-

* See *Hutchinson's History of Massachusetts Bay*, vol. 2, p. 274.

struction, and that "they patrolled the town in parties, with halters, threatening to hang him on the nearest tree. The only place of refuge left him at one time was a private place in his own house, where he remained secreted fourteen days, unknown to any of his family but his wife. During this time parties entered the house by day and by night in search of him. Nor was this all. Their rancor extended to his family. For one evening while his wife and children were sitting in the parlor, a lighted hand grenade [similar to the one used on another occasion at the house of Rev. Dr. Mather] was thrown into the room. But the fuze striking against some of the furniture, fell off before an explosion could take place, and thus providentially their lives were saved. Even after the madness of the multitude had in some measure subsided, Dr. Boylston ventured to visit his patients only at midnight and in disguise."*

The labors of Dr. Boylston, as exhibited by the very respectable number of cases given in his tables, would have been doubled or trebled but for the violent persecution which was raised against him. But as soon as the alarm of the people had passed away and their passions had subsided, they were enabled to see with a clearer vision, and balance with a more correct judgment, the advantages and disadvantages of inoculation as a means of protection from the severity and danger of the casual smallpox. The number of cases that had undergone the operation, with the recognized accuracy of the report, formed a reliable basis on which "sober second thought" might rest its further action, with a confiding faith which wrong-headed doctors, self-willed magistrates and perjured zealots could not destroy.

* See *Thatcher's Medical Biography*, vol. 1, p. 187.

CHAPTER III.

Spread of inoculation in the colonies—Earliest inoculating hospitals—Dr. Boylston and the Councilmen—The epidemic smallpox of 1730—Opposition to inoculation less influential—Dr. Douglas—The epidemic of 1752—Inoculation embarrassed by laws—Tabular exhibit of the casual and inoculated disease—A dastardly attempt to convey the contagion—Epidemic of 1764—Hospitals established, but soon forced to close—Suttonian system introduced—Hospital burnt by a mob—Management of hospitals—Smallpox in the American army—Inoculation hospitals established by authority—A permanent one at Brookline—Epidemic of 1792—A general inoculation followed—Dr. Boylston and his visit to England—His book on inoculation in America—His death and tomb.

A KNOWLEDGE of the practice of inoculation, with the results of the numerous cases of Dr. Boylston, soon spread to the other American colonies, and as the people became familiar with the new practice, it grew more and more into favor. The simplicity of the operation, and the uniform mildness of the symptoms developed during the progress of the disease, brought it in some degree within the scope of domestic practice. In the interior settlements, where doctors were scarce and could only be had by riding long distances, inoculations were frequently made by the common people, and the patients were said to have passed through the various stages of the disease with about the same general results as in cases managed by the profession.

Insulation of the infected, which is so important in preventing the spread of every contagious disease, was more readily attainable in the sparsely peopled settlements of the colonies than in the densely populated districts of the mother country. But the danger of spreading the smallpox was nevertheless a great hindrance to the practice of inoculation even here, and this danger, added to the natural shrinking from a hazardous disease, caused many to put off the inoculation as long as possible; and it was only in con-

sequence of some great alarm from the near vicinity of the disease that the people could be brought with any unanimity to accept the protection which it afforded. But the suppression of smallpox, and the complete protection of society, required that every person should be inoculated; but as no such general inoculation could be had in a new, sparse, and free community, the consequence was that the disease continued to make its unwelcome incursions at irregular periods, and though divested somewhat of its former terrors, it was still a most dreaded visitant. Whenever, therefore, variola became prevalent, inoculators were thronged with applications to administer the disease artificially, in preference to running the risk of taking it casually.

Public hospitals for the insulation of the sick with contagious disease were as yet hardly known in America. The earliest mention which we can find of the erection of any building devoted exclusively to this class of cases is in 1701, when the inhabitants of Salem, Mass., voted *fifty pounds sterling* to build a "pest house." Prior to that time vacant buildings in the outskirts of towns had been used, and continued to be used, for that purpose in many places until a much later date. In 1717 the Selectmen of Boston were authorized to have an acre of land on Deer Island for a hospital, or, as it was then termed, a "pest house." But after the smallpox epidemic of 1730 had subsided, a permanent hospital building was erected on the island for the special purpose of treating persons sick with contagious diseases. It had in view the twofold object of providing suitable accommodations and medical attention for all persons suffering from infectious diseases, and their separation from the rest of the community. Mr. Drake, in his History of Boston, speaks of it as "a good and convenient house on the island called Rainsford's Island, for the reception of such persons as might be visited with any contagious sickness." This was the beginning of the Boston hospital, which has since received

an army of patients and relieved a vast amount of human suffering. This institution has continued to keep pace with the demands of the times, and has become one of the most celebrated curative establishments in our country. Its management is under the joint direction of the city and the State. The example set by Boston was soon followed by other commercial places, so that in a few years there were but few towns of any considerable size which had not provided a refuge for their sick.

When the great smallpox epidemic of 1721 was prevailing in Boston there had been established no sufficient health regulations or complete system of insulation of the infected from the well, although the authorities were as prolific in enactments as if they expected to keep off contagion by mere force of law. The disease disregarded all the restraints devised to check it, and swept on over the town with such fearful havoc as to make it one great hospital, in which every house was but an additional ward, with its patients and nurses. The General Court, which came together on the 3d of November of that year, took the alarm, and, after a session of four days, was removed on the 7th to Cambridge. One of the members from Boston, Mr. Hutchinson, was immediately seized with the distemper, and died. (Note 31.) Mr. John White, who had been Clerk for many years, sought to protect himself from the danger attendant upon the casual disease by inoculation, but was one of the unfortunate six who died under the care of Dr. Boylston. Many of the inhabitants, as has been hinted, fled from the town and sought safety in the isolation of country habitations, and doubt and alarm seized upon the great body of the people. So great was the fear, that even after the General Court had been removed to Cambridge, its members could not be kept together, and it was prorogued by the Governor after a fruitless session of eight or ten days. It was thus under a high state of general alarm that Dr. Boyls-

ton pursued the practice of inoculation, and there is little doubt, in view of the strong opposition on the part of the doctors, and their disposition to bring it into disrepute, that they represented that what he did had a tendency to increase the spread and mortality of the casual disease. A cotemporary historian* says "that the magistrates supposed it (meaning inoculation) had a tendency to increase the malignity and prolong the continuance of the infection, and that therefore it behooved them to discountenance it." It was the same conviction which caused the General Court to consider the matter. The House of Representatives initiated it, and actually brought in a bill and passed it, "prohibiting all persons from inoculation," but the Court was in doubt, and the bill failed to become a law.

Notwithstanding Dr. Boylston's earnestness, perseverance and courage, there is some ground for believing that he did finally yield somewhat to the strong prejudices of the community, and forbore the practice in deference to their opinions. Felt, in his Annals of Salem, quotes an order from the Boston Selectmen, bearing date May 21, 1722, a part of which is as follows: "Dr. Boylston declaring at a public town meeting that he knew of no more than these six men under inoculation for the smallpox, did solemnly promise to inoculate no more without the knowledge and approbation of the authorities of the town."

Although we can find no corroborative statement of the Doctor's public avowal of a determination to desist from the practice of variolation, yet, as the record of the order shows it to have been as late as the middle of May, 1722, when the smallpox had almost disappeared and the motive for inoculation was no longer urgent, he no doubt thus sought to quiet the public mind by a pledge to the authorities of the town.

Boston was again visited by smallpox in 1730, after an

* Hutchinson, *History of Massachusetts Bay*.

exemption from its ravages for nine years. The town in these intervening years had considerably increased in population,* and all who had been born there since the last epidemic, with the addition of a considerable number of emigrants from abroad, as well as many who had come in from the country, were unprotected and liable to the infection. On this occasion the smallpox was brought to the city, by a vessel from Ireland, the preceding fall, but was confined during the winter to a few families living about the place where the ship in which it came discharged its cargo. In March it gained a footing in the town, and spread rapidly in every direction, producing great consternation, and causing many, as on former occasions, to flee to the country for safety. For the greater security of those attending the General Court, it was convened in Cambridge instead of Boston, but as the disease spread, that place was not regarded as safe from its approaches, and the Court was again moved to Roxbury.

The opposition to inoculation at this period had lost much of the sharp and revengeful form it had previously taken, and no obstacles were now interposed by the Selectmen to prevent such as desired to accept the disease, in its milder form, from having it engrafted upon them. But still the old prejudice, as may be supposed, retained some of its vitality, as the whole number inoculated during this epidemic probably did not exceed 400, while the whole number that had the smallpox in the casual way was over 4,000. Of this large number about 500 died, showing one death in every eight persons attacked; whereas of the 400 inoculated twelve only are said to have died, which would be an average mortality of one in 33. (Note 32.) But this number, it must be remembered, was the estimate of Dr. Douglas, still a stubborn enemy of the new practice. The contagion reached

* The population of Boston in 1730 was estimated at 15,000.

its height in June, and from that time gradually declined, and ceased entirely during the winter.

Smallpox re-visited Boston in 1752. For over twenty years the people had been wholly exempt from this dread destroyer, and a new generation, who were entirely unprotected against its advances, had arisen to fill the ways of business and provide for the public weal. The population of the town in the meantime had not materially increased, the emigrants being of late mostly agriculturists, and the speculative attractions of the country drawing somewhat on the surplus laborers of the towns. In the absence of any apparent danger from small-pox, inoculation made no progress, so that this outbreak or presence of the contagion took the people by surprise. The disease, as on former occasions, had been imported. A vessel from London, with smallpox on board, had struck on the bar on entering Nahant Bay, and bilged. This was on the 24th of December, 1751, in the depth of the northern winter, when wrecks are apt to prove peculiarly disastrous to life. But the people of Chelsea and the surrounding towns, with great heroism, succeeded in reaching the vessel, and saved the crew; a noble act, which, however, cost them afterwards many valuable lives, for the rescued crew brought with them the seeds of variolous infection, which soon found its way to Boston, where it raged with fearful havoc for many months.

The disease reached Boston in January, through one of the sailors, and soon began to spread and create an alarm among the citizens. To enable the people to avoid houses where the infection had manifested itself, it was ordered that a flag should be hung out as a warning, which was doubtless a wise precaution. It rapidly became epidemic, and proved to be of the most malignant type. By March it had fairly invaded every block and street in the town, and on the 23d of that month inoculation was commenced. (Note 33.) Old prejudices against the remedy having pretty much died

out, and the danger being imminent, the resort to it was much more general than on any former visitation of the disease. But lest the practice of inoculation should have the effect of continuing the contagion after the epidemic might have run its course, the Selectmen requested the doctors to cease all inoculations as soon as the casual disease showed symptoms of declining, which they did on the 27th of July.

From the 1st of January down to the time when inoculation ceased, or, as some have it, down to the 24th of July, there had been, according to the statistics collected by the Selectmen, 7,653 cases of smallpox, and 545 deaths, as follows :

	Number of Cases.	Deaths.	Ratio of Deaths.
Had the smallpox by contagion—white	5,059	452	1 in 11
“ “ “ black	485	62	1 in 8
Had the smallpox by inoculation—white	1,970	24	1 in 82
“ “ “ black	139	7	1 in 20
	7,653	545	1 in 14

At the time these facts were collected there were still 23 persons sick in 17 different families, and there remained in the town 174 who had not taken the disease.

These figures show the number that were attacked by the casual disease, also those by inoculation, and that, partial as the practice had been, many lives were saved, to say nothing of the suffering which was prevented.

During the continuance of the contagion, hospitals were extemporized in favorable localities and nurses pressed into service by authority of the town to care for the afflicted. The police regulations of the town, and the accommodations and medical treatment of the patients, showed a decided advance in the management of the disease over former epidemics.

From Boston this variolous pest spread into the adjacent towns and villages, and thence through most of the colonial settlements. Villages, to protect themselves, placed guards at their entrances, fenced up roads and bridges to prevent communication with infected places, and used every means in their power to isolate themselves from such districts. It is not known what were the precise results of these precautions, but it cannot be doubted that such a course would delay the progress of the disease, if not protect many places from its scourge.

It is a well-known fact that all great excitements have a tendency to demoralize society, and a curious instance of the fact was exhibited by some parties in Marblehead during the prevalence of this epidemic. This was an attempt to communicate the smallpox to Judge Lynde's family. The Judge was naturally very indignant, and offered a reward of £500 for the detection of the miscreant, and Lieut.-Governor Phipps issued a proclamation, the object of which was to aid in the detection of the perpetrator, and to deter others from committing similar outrages.*

The next visitation of smallpox to Boston and the State of Massachusetts was in 1764. The most important public event which took place during this epidemic was the establishment of inoculating hospitals. Petitions to the General Court were circulated, and a formal grant was enacted, under which three such hospitals (Note 33) were opened for the reception of patients. The success of these institutions was by no means commensurate with the expectations entertained by the friends of the measure. The impression became general that the disease spread from the hospital to residents in the neighborhood, so that the Court revoked their charter, and the reception of patients was discontinued. Whether the control over the patients was not strict enough

* *Felt's Salem*, vol. 2, p. 425.

to prevent all intercourse with the inhabitants, as it should have been, we cannot say, but we are inclined to suspect that this was made the pretext to have them abolished. Reports and contemporary accounts assure us that scarcely a single death occurred among those inoculated in these institutions, and their discontinuance was only in deference to public opinion.

A knowledge of the improved mode of inoculating for the smallpox and the treatment of the disease instituted by Mr. Sutton in England, was put in practice in America in 1773. James Latham opened a hospital in Salem, Mass., that year, where he practised upon the Suttonian plan, and had a fair degree of patronage and success. At one time he had 132 patients in his establishment under treatment, at another 137, and later, in 1777, there were 216 entered for inoculation at one time. The adoption of this plan enabled the doctor to greatly abridge the period of treatment, and, by the judicious employment of capital and labor, he brought the price so low as to be within the means of all. (Note 34.)

But the people in all parts of the Commonwealth were not even yet quite reconciled to the idea of nursing contagion in hospitals, and being persuaded that the building on Roache's Point used by this class of patients would eventually spread the smallpox among the surrounding inhabitants, they became excited, and gathering in a mob on the 26th of January, 1774, burnt it to the ground. (Note 35.) Its loss was subsequently supplied by another, which was erected on the Neck. In 1773 the people of Marblehead obtained an order to build a smallpox hospital on Cat Island. This is an excellent location, being perfectly insulated. It contains over nine acres of land, and has an excellent spring of fresh water at its southeast end.

Salem was again visited by smallpox in 1792, when it was attended with the usual mortality. There were inoculated in the town during this epidemic 710 persons, and in the neighborhood 275 more, of whom only five died.

When the American Revolution opened, in 1775, inoculation was practised in all the colonies as an approved remedy against the dangerous and much-dreaded visitations of smallpox; but it was not deemed so safe or agreeable as to cause it to be generally adopted except in time of imminent danger from the original contagion. Hence it never obtained to such a degree of general patronage as to make it a protection to the great mass of the people, and consequently when smallpox invaded the army, gathered as it was largely from interior districts where the disease seldom penetrated in an epidemic form, it found an unusual portion of unprotected persons, and proved more destructive to life than the guns of the enemy. It continued during the earlier years of the war to be the scourge of the camps, and prevailed to an alarming degree wherever our armies were stationed. The havoc which it made among the troops in 1776 was so great, that had the British commanders been acquainted with our deplorable condition (Note 36) they might have marched almost without opposition through the country, even where our defences were strongest.

Strong corroborative testimony of the beneficial results obtained for the army by universal inoculation is given by Dr. Ramsay, who was an eminent surgeon (Note 37) throughout the glorious campaigns which achieved our independence, and also an esteemed chronicler of events.

The smallpox broke out in 1776 among the soldiers of the American army encamped in the town of Cambridge, when nearly the whole body of them was inoculated by Dr. Bond, an aged and experienced physician, who, when young, had been cotemporary as a practitioner of medicine with the latter days of Dr. Boylston, the earliest and ablest champion of that salutary art in America. He had thus enjoyed frequent opportunities of conversing with the doctor upon a subject which had so largely engaged his attention. Some idea may be formed of the neglect of this practice,

even at this late day, among the people, when the doctor was called upon during the same year, and within a few weeks, to inoculate twenty-nine practitioners of medicine.

Professor Waterhouse, in one of his letters to Dr. Hoggarth, in speaking of this wise precaution against one of the chief enemies of human life, the variolous contagion, says: "When General Washington inoculated his New England army, there were scarcely men enough free from the disease, or not liable to take it, to keep guard at the different hospitals."

A further protective measure of great value was the establishment of permanent hospitals for inoculation, which were to be kept open for the reception of patients at all times. (Note 38.) Such a hospital was established in Brookline, and continued for a long time under the direction of Dr. Aspinwall, the successor of Dr. Boylston. He was a man of ability in his profession, and had extensive experience in the treatment of the epidemic or casual smallpox and the inoculated disease. Heretofore when an epidemic had ceased its ravages, the hospitals which had been extemporized were immediately closed; but henceforth they were to be open at all times, and the fault would be with the people if they did not avail themselves of its advantages. For years numbers of persons flocked to Dr. Aspinwall's hospital to be carried through the disease, and returned home with warm expressions of their satisfaction and confidence in his skill. The percentage of deaths at the hospital was never greater than one in two hundred. This establishment was maintained with increasing popularity until the discovery of vaccination, which robbed it of its patronage.

The smallpox again visited Boston, and the New England States generally, in an epidemic form, in 1792. To appease the alarm of the inhabitants (Note 39) respecting the danger of infection from the dreaded disease in the casual way, and in compliance with the popular wish to receive the inocula-

ted disease, the authorities consented, and all the unprotected citizens submitted themselves to the operation within three days. The want of preparation on the part of patients, and the hurry and confusion attending the practice on so large a scale, precluded the possibility of giving in every instance, either in the primary operation or when the disease developed itself, all the requisite attentions necessary to insure the most satisfactory results.

The number of inoculations at this time was 9,152, performed without any discrimination or preparation. Out of this number 102 deaths are said to have occurred. The mortality was almost exclusively confined to the poorer class, many of whom were entirely destitute of the necessaries of life, and in many instances without the advice of a physician or the aid of a nurse.

Dr. Boylston, who inaugurated in America the great changes in the professional mode of dealing with smallpox which have been briefly sketched in the preceding pages, lived to witness the success of many of them, and enjoyed the triumph of common sense and experiment, guided by skill, over prejudice and superstition. He did not pass "to that bourne from whence no traveller returns" till 1766. His great battle with the medical conservatives and popular ignorance, which gained him his high distinction, was fought in 1721. The clouds which for a time gathered around him in those dark hours of doubt and uncertainty were soon dispelled, and he came forth from his place of concealment and from the persecution of the populace and the ban of his professional brethren, to take his place among the leaders and heroes of the world's history. Accounts of what he had accomplished found their way across the Atlantic, and were favorably commented upon in professional circles and noticed in the publications of the Royal Society. Not only had his name survived the avalanche of opprobrious epithets

which envy and ignorance had heaped upon it, but his zeal in the cause of humanity had indelibly engrossed it upon the scroll of imperishable honor.

In 1723, two years after Drs. Douglas and Dalhonde had exiled him in disgrace, as they supposed, under the official edict of the Justices of the Peace and the Selectmen of Boston, he received from Hans Sloan, Physician to the King and President of the Royal Society, an invitation to visit England and confer with the savans upon the subject of inoculation. He accepted the invitation, and a year or two later crossed the Atlantic. His cordial reception by the leading physicians in London was a proud day for the contemned and vilified doctor. He was received into the choicest literary circles, was introduced at court, presented to the royal family, and elected a member of the Royal Society. But, most important of all, he published, in 1726, at the request of the Royal Society, a particular account of his inoculations in New England. This book is a complete record of his labors, as well as a most valuable addition to the literature of the subject. By permission he inscribed the volume to Caroline, Princess of Wales, soon to become Queen of England.

It is supposed, too, that these special marks of approbation from royalty were attended by some munificent endowment from the national treasury, for soon after his return to his cherished home in New England, he appeared to be not only loaded with honors, but was also possessed of wealth. His work on Inoculation in America was re-published in Boston in 1727. A copy of this edition has been given by one of his descendants to the library of Harvard University.

About this period he took up his residence on his patrimonial estate in Brookline, and devoted himself to science and literature, though remaining for many years the acknowledged head of his specialty in New England. He contributed many valuable articles to the Royal Society.

Agriculture had special attractions for him, and he beautified and enriched his valuable farm. He indulged his taste for fine horses, and took great pride in improving the breeds of domestic animals. He lived at his ease, and saw inoculation widely practised without fear of the squibs of the "Courant," or the official bulletins from the Selectmen.

Dr. Boylston died in 1766, having attained to a ripe old age and a wide celebrity throughout the world for his philanthropy. His sincerity of character and urbanity of manner caused him to be greatly beloved by the community in which he lived. His remains were interred on his patrimonial estate, and his tomb bears the following inscription: "Sacred to the memory of Dr. Zabdiel Boylston, physician and Fellow of the Royal Society, who first introduced the practice of inoculation in America. Through a life of extensive beneficence he was always faithful to his word, just in his dealings, and affable in his manners, and, after a long sickness, in which he was exemplary for his patience and resignation to his Maker, he quitted this mortal life on the 1st day of March, A.D. 1766, aged 87 years."

N O T E S .

NOTE 1. (Page 154.)

In a letter by Dr. Douglas (who was an earnest opponent of inoculation), written to Dr. Cadwallader Colden, of New York, May 1st, 1722, there is given an amusing account of the effect produced by loaning these books. He says, "Having, sometime before the smallpox arrived, lent to a credulous vain preacher (Mather, Jr.) the Philosophical Transactions (Nos. 337 and 339) which contain Timoni's and Pylorini's accounts of inoculation from the Levant, that he might have something to send home to the Royal Society, which had long neglected his communications as he complained, he sets inoculation to work in June, and by the 18th November one hundred were inoculated; and by January, in all, some few more than 250 in town and country."—(Quoted in Drake's *History of Boston*, p. 562.)

Dr. Boylston, in his work, alludes to the Transactions of the Royal Society, containing the letter of Timoni and Pylorini, and says: "Dr. Douglas, who owned them, and had taken them from Dr. Mather, refused to have them read, such was his extraordinary care lest the people, in time, should have been reconciled to the practice and take the benefit of it."

NOTE 2. (Page 154.)

The Selectmen of Boston, in their report of July 22d, 1721, say that "the small-pox was communicated to the town about the middle of April, being brought there by the Saltortuda's [Saltortugas] fleet." Dr. Douglas also dates its appearance about the same time, as may be seen in his letter to Dr. Cadwallader Colden, bearing date July 28th, 1721, in which he says: "It was imported here [meaning the smallpox] about the middle of April last, from Barbadoes, via Saltertuda."—(*Mass. Hist. Coll.*)

NOTE 3. (Page 154.)

It is a fact worthy of note in the history of medical literature on this continent, that the earliest medical tract printed in America of which we have any

record, was upon the subject of smallpox and measles. The work alluded to was published in 1677 by Thomas Thatcher, a minister of the gospel as well as a practising physician. The title of the treatise was, "A brief Guide in the Smallpox and Measles." The earliest date at which the title of "doctor" is found prefixed to that of physician in Massachusetts is in 1779, after which period the person so titled was forbidden to wear his sword.

NOTE 4. (Page 154.)

From the first settling of the Province of Massachusetts Bay, the smallpox had been epidemic in Boston eight times up to 1752, viz., in 1649, 1666, 1678, 1689, 1701, 1721, 1730, and 1752.—(*Douglas's Summary*, vol. 2, p. 395.)

NOTE 5. (Page 155.)

Dr. Boylston, in his "Historical Account of Inoculation in America," after mentioning the fact that Rev. Mr. Mather had transcribed the articles from the "Transactions," and sent copies to all the doctors, adds: "Upon reading of which I was very well pleased, and resolved in my mind to try the experiment; well remembering the destruction by the smallpox nineteen years before, when last in Boston, and how narrowly I then escaped with my life." It appears from a pamphlet known as "A Vindication of the Ministers of Boston," that Dr. Mather sent, with the manuscript copies of the articles on the Turkish Inoculation, a circular letter of his own, in which he suggested, with great propriety, that the doctors should hold a meeting and agree on the course which they would take in relation to the proposed new remedy. He justly remarks in the circular that "whoever first begins the practice, if approved that it should be begun at all, may thus have the concurrence of his worthy brethren to fortify him in it." The circular letter, and the copies made of Timoni's and Pylorini's account of the practice, were sent on the 6th of June, 1721, but the physicians never met or consulted as proposed, and therefore nothing was done by concert.

NOTE 6. (Page 155.)

Dr. Zabdiel Boylston was the grandson of Thomas Boylston, who at the age of 20 emigrated from London to America, and settled near Watertown, Mass. The emigrant was the son of Henry Boylston, of Litchfield, in England. Thomas was a farmer, and died in 1653, at the age of 38, leaving a wife and three children. The youngest, a son, Thomas, was born in 1645. He devoted himself to the practice of medicine and surgery, and settled in the region of Muddy River, a part of Boston till 1705 (now Brookline), to practise his pro-

fession. During the King Philip War he acted as Surgeon. He acquired by his practice considerable property, and lived the remainder of his days in Brookline, where he died in 1695, at the age of 51, leaving a wife and numerous children. His will was probated on the 16th of the following December. Zabdiel Boylston, the subject of this note, was the seventh of his twelve children, and was born at Brookline in 1679, according to his baptismal registration, which is on the 9th of March of that year. Zabdiel received a liberal education for the period in which he lived, and prosecuted his medical studies partly with his father, and partly with Dr. John Cutler, an eminent physician and surgeon then practising in Boston.

After completing his course of medical studies, he settled to practise his profession in the town of Boston, where he received a liberal share of patronage. Possessing a philosophical turn of mind, he was studious in his habits, sedate in his manners, and was scrupulously correct in his principles, so that he soon won the confidence of the whole country. When the subject of inoculation was brought to his attention as a remedy to control the severity and lessen the mortality which followed casual smallpox, he gave it his serious attention, and became convinced of the propriety and safety of the practice, and labored to induce the different members of the profession in Boston to unite in a concerted and public trial of the proposed remedy; but failing in this, he boldly assumed the responsibility himself, and won a distinction which abundantly compensated him for all the obloquy which for a time he was obliged to endure from the opponents of the practice. I am indebted to Bond and Drake for most of the facts in Dr. Boylston's genealogical history. Thatcher, in his Medical Biography, has been singularly unfortunate in giving the doctor's genealogy, although he credits the information he relates to members of the Boylston family.

NOTE 7. (Page 155.)

Cotton Mather was the oldest son of the Rev. Dr. Increase Mather, and was born in Boston in 1662. His mother was the daughter of the famous John Cotton, a minister of Boston. He graduated, at the age of 16, at Harvard College, in 1678, and was ordained to the ministry in 1684. The Rev. Cotton Mather was a man of prodigious industry, and capable of performing the greatest literary labors with surprising rapidity. It was said of him that he could read a folio of several hundred pages and write a sermon in a forenoon. He became acquainted with a subject and grasped its facts by a sort of intuition. His eccentricities were great, which caused his motives at times to be misunderstood. Never being neutral upon any subject or question of policy, it is not wonderful that he had enemies. He wrote too much to write well always. He possessed the greatest versatility of mind, and was always engaged in some literary or scientific investigation. He was a close observer of the physical phenomena of nature, and some of his observations were quite original, and entitle him to credit. He has left a record of some original facts observed in connection with smallpox, regarding the vexed question of whether it does attack animals. He says that "some cats, in 1721, in Boston, had the regular smallpox, and died of it;" and further adds, that "during the prevalence of the disease the pigeons and dunghill fowls did not lay or hatch."

It was believed, at this period, by well-informed persons, that many of the domestic animals were liable to diseases similar to those that attacked the human race. Mather contended that this was absolutely true with regard to smallpox, and later observations by scientific men in Europe have substantiated this fact.

In Massachusetts, in 1756, this belief had gained such an influence among the people that a war almost of extermination was carried on against cats and dogs, on the ground that they spread the contagion of smallpox from house to house and from one person to another. An order was carried before the town council at Salem as late as the fall of 1773, through the influence of Thomas Heather, "that dogs and cats be killed, lest they spread the contagion of smallpox."—(See *Felt's Salem*.)

DeFoe, in his History of the Great Plague that prevailed in London in 1665-66, says that great numbers of dogs and cats were killed because it was believed they served as a means of spreading the disease.

NOTE 8. (Page 156.)

Rev. Increase Mather was a noted and influential man throughout the New England settlements. His ministerial labors extended through a period of sixty-six years, and for sixty-two years he ministered in the same Church. He was honored with the Presidency of Harvard University for twenty years. The Province of Massachusetts Bay selected him as their agent to England, in which capacity he served them for some years. His belief in witches and his connection with the punishment of persons suspected of possessing demoniac powers, has thrown a shadow over his memory, but aside from this he enjoyed a long and honorable life.

NOTE 9. (Page 156.)

Benjamin Colman, a minister of Boston, wrote and published, in 1720, a pamphlet entitled "Some Account of the New Method of receiving the smallpox by engraving or inoculating," in which he made an able defence of the practice from a moral standpoint of view, justifying Dr. Boylston and other inoculators, and encouraging persons to receive the disease by this method rather than run the risk of being infected with the casual disease, which all knew to be so hazardous to life. Many sermons were preached in defence of the practice, a few only of which have been preserved.

NOTE 10. (Page 156.)

One of the Rev. Increase Mather's sermons on this subject has been preserved. It was preached at a time when Dr. Boylston had inoculated about 100 persons. The sermon is entitled, "Several reasons proving that Inoculation, or transplanting the smallpox, is a lawful practice, &c."

NOTE 11. (Page 156.)

Dr. Boylston says: "On the 26th June, 1721, I inoculated my son Thomas, of about six; my negro man Jack, thirty-six; and Jackey, two and a half years old."

These were unquestionably the first inoculations on the American continent, and at that time the Doctor was not acquainted with the fact that the practice had been commenced in England. The variolous disease in these cases developed regularly, and was of the mildest kind. They all recovered speedily, and without any unfavorable symptom whatever.—(See Zabdiel Boylston's *Historical Account of Inoculating the Smallpox in New England*.)

In regard to dates, we have followed Dr. Boylston, who is undoubtedly correct. His dates, too, are corroborated by Dr. Douglas, who says, in a letter of May 1st, 1721, that he lent the books before the smallpox arrived, and that he (meaning Mather) set inoculation to work in June. The report of the Selectmen also connects the inoculation movement with the prevalence of the smallpox, which was in 1721. But all authorities do not agree upon the year. There is published in the Massachusetts Historical Society Collections a letter from Dr. Franklin, addressed to Dr. Heberden in 1759, in which he says, "Inoculation was first practised in Boston by Dr. Boylston, in 1720. It was not done before in any part of America, and not in Philadelphia till 1730."

The same date is given by Dr. Bartlet, in his account of the early history of medicine in the American colonies, published in the Massachusetts Historical Collections. He says, alluding to Dr. Boylston, his experiments commenced on his own son in 1720. The dates given by Franklin and Bartlet are evident blunders.

Note 12. (Page 156.)

The following table, from Dr. Boylston's work, gives a complete history of the cases:

Ages of Subjects.	Number Inoculated.	Had the smallpox by inoculation.	No effect.	Suspected of having died of inoculation.
From 9 months to 2 years old	6	6		
" 2 years to 5 "	14	14		
" 5 " " 10 "	16	16		
" 10 " " 15 "	29	29		
" 15 " " 20 "	51	51		
" 20 " " 30 "	62	60	2	1
" 30 " " 40 "	44	42	2	1
" 40 " " 50 "	8	7	1	
" 50 " " 60 "	7	6	1	2
" 60 " " 70 "	7	7		1
Inoculated by Drs. Roby & Thompson in Roxbury and Cambridge. }		244	238	6
		36	36	6
Two inoculated by Dr. Boylston, } after his tables were printed.		280	274	6
		2		6
		282	274	6

NOTE 13. (Page 156.)

The year was not commenced with uniformity among early nations. The year of the Egyptians, the Jews, and the Greeks, corresponded neither with that of the Romans, nor with each other. To avoid perplexity in the dates met with in ancient records, it is necessary to pay some attention to this fact, and particularly to the practice of double-dating in vogue among our ancestors. The length of the actual year is determined by the exact time required for the earth's revolutions round the sun. This time was closely approximated, though not correctly ascertained by the ancients, owing chiefly to the imperfection of the instruments with which they made their observations. But with such nicety has this period been determined by modern astronomers that it is now known to every schoolboy that 365 days 5 hours 48 minutes and 49 seconds and seven-tenths of a second, is the exact time required by the earth to complete its circle.

The old Roman year consisted originally of ten months, and began to compute with March, as is evident from several of the names which are still retained in use, as Quintilis, Sextilis (answering to July and August), September, October, November and December.

To these ten, the second King, Numa Pompilius, whose reign ended about 672 years B.C., added two others at the close, viz.: January and February. These twelve months were lunar, and consisted of twenty-nine days and a half each, making but 354 days in all. The difference between the lunar and solar year was made up, or intended to be made up, by an intercalation of a month every second year, to consist alternately of 22 and 23 days. But this intercalation was made irregularly, and great confusion in the times, seasons and festivals named in the calendar ensued. To remedy these evils, Julius Cæsar, no less eminent as a scholar than as a statesman and military commander, undertook and put in practice a more correct system of dividing the year. He abolished the use of the lunar computation, and, with the aid of Sosigenes, an eminent astronomer of Alexandria, computed the solar year to be 365 days and 6 hours. Here it will be perceived that an error of a few minutes in the year was continued. He directed that the civil year, as a matter of convenience, should be reckoned to consist of 365 days for three successive years, the fourth to have an additional day, added to February, to absorb the surplus hours, thus making every fourth year to consist of 366 days. The year in which this intercalation is made is called Bissextile, on account of the addition, or twice-reckoning. Leap year is explained thus in a prayer book of Queen Elizabeth's time: "When the years of our Lord (i. e., when the number of years from the birth of Christ) may be divided into four even parts, which is every fourth year, then the *Sunday letter leapeth*, and that year the Psalms and Lessons which serve for the 23d of February shall be read again the day following, except it be Sunday," &c.

Julius Cæsar also decreed that the kalends of January (January 1) should be fixed as the winter solstice, and should thenceforth be the beginning of the current year, on which day "all the annual magistrates of the Romans first enter on their offices."

The Catholic Church adopted the Julian or Roman calendar, and it was for many ages observed by all Christian nations. Had the solar year coincided exactly with the time calculated by the Julian method, there would have been no occasion for any alteration. But the time recorded by it exceeded the solar

year by 11 minutes 10 seconds and 3-10 of a second; consequently the conventional year had fallen, in 1582, about ten days behind the real time.

At the time of the Council of Nice, which sat A.D. 325, the vernal equinox was upon the 21st of March; but in 1582 it returned as early as the 11th of the month. This deranged all fixed anniversaries and festivals, and caused such serious annoyances in ecclesiastical feasts designed to commemorate the remarkable events connected with the birth, mission and death of our Saviour, that Pope Gregory XIII. was led to make what is known as the second correction of the Roman calendar. He directed ten days to be dropped that year (1582) from the computation, so that the 5th of October should be counted as the 15th. He estimated the overplus of time reckoned at a little over eleven minutes per year, or 18 hours 37 minutes and 10 seconds in a century, making one day every 134 years, or nearly three days in four centuries.

To prevent a recurrence of the error in future he directed that the intercalary day should be omitted three times in every 400 years, viz., in every centenary year whose number could not be divided by 4 without a remainder (as 1700, 1800, 1900, 2100, &c.), but added in the others (as 1600, 2000, 2400). This arrangement was made upon the presumption that it was an exact equivalent for the difference of time between the Julian and the solar year. And as the difference was estimated in Pope Gregory's day at 11 minutes annually, it was a close approximate to such an equivalent, making almost one day in 134 years, which varied but little from three days in 400 years. More accurate calculations, however, have since determined the time to be 11 minutes 14 $\frac{1}{2}$ seconds, which makes a day in 128 years, or three days in 384, leaving sixteen years in four centuries unaccounted for. The Gregorian method of computation, although not absolutely exact, is perhaps as near the truth as any that can be devised which would be equally convenient for use.

The amended calendar, known as the Gregorian computation or "new style," was promptly adopted in all Catholic countries, but was pertinaciously resisted by all Protestant governments. Up to the middle of the last century the Julian reckoning, or "old style," was retained in all legal proceedings throughout Great Britain and her American colonies.

Although the acceptance of the first of January as the beginning of the year was pretty general, yet the ancient Jewish year, which began on the 25th of March, continued to have a legal position in many Christian countries down to within a few centuries. This was also "Lady Day," or the day of the "Annunciation of the Virgin Mary," when, according to the traditions of the Catholic Church, her miraculous conception of the "Son of God," foretold in Luke i. 31—35, is said to have taken place. In all dates of an individual character, or as attached to literary productions, it was left entirely optional with the authors to use either the old or new style.

This want of a fixed system in the beginning of the year caused great perplexity, and often left the reader in doubt, when the months of January and February were mentioned, whether they had been reckoned at the close or the beginning of the year. From the necessities of the case a kind of formula of double-dating grew into practice to express the old or new style; but as it was not universally adopted, it was of but limited practical advantage. The mode was this: During the months of January and February, and to the 24th of March, the year was stated thus, 1720-21, or $17\frac{20}{21}$, meaning that by the ancient

mode of calculating the month belonged to 1720, but by the new to 1721. After the 25th of March there was no difficulty, for by both calculations the succeeding months belonged to the new year.

By an act of the British Parliament, passed in 1751, it was ordained that after December 31, 1751, each year in all her dominions should begin with January 1st instead of March 25th, as had been the custom and the law for generations, and at the same time it was directed that 11 days be dropped from the calendar of 1752, by enumerating the day that should follow September 2d of that year as September 14th; and in all other respects adopting the Gregorian mode of computation. It will be observed that 11 days had to be added when the new style was adopted in Great Britain, while but 10 were added when the Julian system was first amended. The reason of this is explained in the arrangement for the disposing of the centenary intercalary days.

Gen. Washington was born February 11, 1732, old style. Great Britain, in carrying forward the calendar 11 days, makes it necessary, in expressing this auspicious occurrence under the new style, to add the 11 days, which gives us Feb. 22d. To give the application of the Gregorian rule to a period anterior to the adoption of the correction of the calendar, or when the difference between the Julian and solar year had amounted to 10 days, we will take the discovery of America, which dates from the discovery of St. Salvadore, one of the Bahamas, by Columbus. This appears to have been October 12, 1492, old style, or October 21, 1492, new style, the difference between the calendars at that period being but nine days.

France took the lead in fixing by law the 1st of January as the initial day of the year, as well as adopting the new style, which she did in 1564, some years previous to the promulgation of the Gregorian decree upon the subject. The measure was adopted in different countries at various dates.

The new style was adopted in Italy and the Pontifical States in 1582; in Scotland it was adopted by a decree in privy council by James VI. in 1600; in Holland and Protestant Germany in 1700; and in Sweden in 1753. Russia alone, of all Christian countries, retains the Julian computation, without having adopted any means to correct the difference between the time reckoned and the exact solar year. With her the intercalary day has been twice added, viz., in 1700 and 1800, while it has been omitted in all countries adopting the new style. Therefore to bring Russian dates during this century into conformity with our own, 12 days have to be added; and after 1900, unless she sooner makes a change in her computation, 13 will have to be added.

Great Britain retains the old style in computing her Treasury accounts. Her Christmas dividends, therefore, do not fail due for twelve days after. The Chancellor of the Exchequer also begins his year on the 25th of March. The consequence is, the year with him practically begins and ends on the 5th of April.

NOTE 14. (Page 158.)

A singular though considerate regulation existed from an early period of the settlement of Massachusetts with regard to funerals of persons dying of small-pox. The constable was required by law to attend all such funerals. The order reads thus: "Y^e funeralls of any y^t dy of y^e smallpox and walk before y^e corps to give notice to any y^t may be in danger of y^e infection."

NOTE 15. (Page 158.)

In Great Britain, from the commencement of the practice of inoculation to the close of the year 1728—that is to say, during seven years—there were but 897 persons inoculated, and out of this number 17 are set down as having died, which is 1 death to every 52 persons inoculated.

NOTE 16. (Page 159.)

The records of the town of Scituate for the year 1721 show that her citizens in town meeting determined, owing to the unparalleled suffering among the poor in Boston, caused by the long continuance of epidemic smallpox, to send £60 for their relief. Dean, in his History of Scituate, p. 112, gives an extract from the town records as follows: “The town, considering the distressing circumstances of the poor people of the town of Boston, by reason of the present sickness of smallpox, agreed to advance the sum of £60 in bills of credit, to be sent to Col. Samuel Chickley, Mr. Daniel Oliver and Deacon Samuel Marshall, to be distributed for the relief of the poor.”

NOTE 17. (Page 160.)

See Woodville’s History of Inoculation, p. 120, where he says: “Before I dismiss Dr. Boylston’s pamphlet, it may be proper to remark that he seems to have had discernment enough to discover that the smallpox as casually received is much longer in taking effect than when communicated in the way of inoculation, and that the latter supersedes the former by four or five days, a discovery of which a more modern inoculator has taken the credit.”

NOTE 18. (Page 164.)

The following passage will serve to show the style and temper in which the controversy was conducted:

“To our amazement we find a notorious, scandalous paper, called the ‘*Courant*,’ full freighted with nonsense, unmanliness, railcry, profaneness, immorality, arrogance, calumnies, lies, contradictions, and what not, all tending to quarrels and divisions, and to debauch and corrupt the minds and manners of New England. And what likewise troubles us is, that it goes current among the people that *the practitioners of medicine* in Boston (who exert themselves in discovering the evil of inoculation and its tendencies—several of whom we know to be gentlemen of birth, education, probity, and good manners) are said, esteemed, and reputed to be the authors of that flagitious and wicked paper.”

NOTE 19. (Page 165.)

This order was worded in the roundabout diction of the time, as follows: "That whosoever shall come into this town of Boston from any other town presumtuously, to bring the smallpox on him or herself, or be inoculated, shall forthwith be sent to the hospital or pest-house, unless they see cause to depart to their own homes. Or if any person be found in the town under that operation, which may be an occasion of continuing a malignant infection and increasing it among us, that they be removed immediately, lest, by allowing this practice, the town be made an hospital for that which may prove worse than the smallpox, which hath already put so many into mourning. And that the Justices and Selectmen be desired to put the method above said into practice without delay as the law directs."

NOTE 20. (Page 165.)

The "News Letter" of Nov. 21, 1721, gives the incident in the following language:

"At the house of the Rev. Dr. Cotton Mather there lodged his kinsman, a worthy minister, under the smallpox, received and managed in the way of inoculation. Towards three o'clock in the night, as it grew towards the morning of Tuesday, the 14th of this instant, November, some unknown hand threw a fired grenade into the chamber of the sick gentleman, the weight whereof alone, if it had fallen upon the head of the patient (which it seemed aimed at), would have been enough to have done part of the business designed. But the grenade was charged with combustible matter, and in such a manner that upon its going off it must probably have killed all the persons in the room, and would have certainly fired the chamber and soon laid the house in ashes, whieh has appeared incontestable to them that have since examined it. But the merciful providence of God so ordered it that the grenade, in passing through the window, had, by the iron in the middle of the casement, such a turn given to it that in falling on the floor the fired [ignited] wildfire in the fuze was silently shaken out some distance from the shell, and burned out upon the floor without firing the grenade. When the grenade was taken up there was found a paper so tied with thread about the fuze that it might outlive the breaking of the shell, whreon were these words: 'Cotton Mather, I was one of your meeting; but the cursed lie you told of — — (you know who) made me leave you, you dog. And, damn you! I will inoculate you with this—with a pox to you!' "—
(See *Buckingham's Newspaper Literature*, vol. 1, p. 23.)

NOTE 21. (Page 167.)

"First. About twenty-five years ago I was at Cremona, in Italy, in the French army, when there were thirteen soldiers upon whom this operation was performed, of which operation four died; six recovered, with abundance of trouble and care, being seized with parotid tumors, and a large inflammation

in the throat of one of them was opened; his diaphragm was found livid, the glands of the pancreas tumified, and the caul gangrened. On the other the operation had no effect.

"Second. In the year 1701, being in Flanders, there was committed to my care, by M. le Due de Geirche, Colonel of Dragoons, one Captain Hassart, taken ill of the smallpox, who told me in these very words: 'Ten years ago I was inoculated five or six times without that cursed invention taking effect upon me; must I then perish?' He was so violently seized that he had several ulcers upon his body, especially one upon his arm, which occasioned a lameness thereof for life.

"Third. At the battle of Almanza, in Spain, the smallpox being in the army, two Muscovite soldiers had the operation performed upon them. One recovered, the other received no impression, but six weeks thereafter was seized with a frenzy and swelled all over his body. They, not calling to mind that the operation had been performed upon him, believed he was poisoned. It was ordered by Helvetius, Physician to his Royal Highness the Duke of Orleans, Don Lorenco Bollatio, and Don Bentura Barrera, two of the King of Spain's physicians, that the body should be opened. His lungs were found ulcerated; from whence they concluded that it was the effect of *that* corruption which, having infected the lymphæ, did throw itself upon that vital part which occasioned his sudden death."

Dr. LAWRENCE DALHONDE, Boston.

NOTE 22. (Page 167.)

Dr. Woodville, in his History of Inoculation, says: "The New England inoculation excited such attention that it was for awhile restrained by the strong arm of the civil power, and the inoculator, Dr. Boylston, was persecuted with the utmost malevolence." Thatcher, in his Medical Biography, speaking of Dr. Boylston, says: "He underwent repeated examinations, and although he invited all the practitioners in Boston to visit his patients and judge for themselves, he received only insults and threats in reply."

NOTE 23. (Page 168.)

Dr. Boylston says, in the preface to his Historical Account of Inoculation in New England: "I have been basely used and treated by some who were enemies to this method, and have suffered much in my reputation, and in my business too, from the odium and reflections cast upon me for beginning and carrying on this practice in New England."

NOTE 24. (Page 168.)

Among the prominent and influential friends who steadfastly adhered to Dr. Boylston and the cause of inoculation, were the Rev. Increase Mather and his

son Cotton Mather, Rev. Mr. Colman, Rev. Mr. Cooper, Rev. Mr. Williams, and many other influential citizens. But these reverend gentlemen particularly deserve well, for they exerted all the influence they possessed, both as ministers and individuals, to recommend the measure to the public.

NOTE 25. (Page 168.)

The following is a specimen from one of the many which the inoculation excitement produced :

"To spread abroad a mortal contagion, what is it but to cast abroad arrows and death ? If a man should wilfully throw a bomb into a town, burn a house, or kill a man, ought he not to die ? I do not see how we can be excused from great impiety herein, when ministers and people, with loud and strong cries, make supplication to the Almighty God to avert the judgment of the smallpox, and at the same time have been carrying about instruments of inoculation, and bottles of the poisonous humors, to infect all who are willing to submit to it, whereby we might as naturally expect the infection to spread as a man to break his neck by casting himself headlong from the highest pinnacle. Can any man infect a family in the town in the morning, and pray to God in the evening that the distemper may not spread ? "

NOTE 26. (Page 168.)

The three following ministers published sermons in favor of the practice : Rev. Increase Mather, Rev. Mr. Cooper, and Rev. Mr. Williams.

NOTE 27. (Page 168.)

Dr. Benjamin Franklin became an earnest and influential advocate of the practice of inoculation, as I have noticed at some length in giving the history of inoculation in Philadelphia.

NOTE 28. (Page 169.)

In the "Courant" of December 4, Franklin gives the following as a part of the substance of the conversation : "Young man, you make it your business, in the paper called the 'Courant,' to vilify and abuse the ministers of this town. There are many curses which await those that do so. The Lord will smite through the loins of them that rise up against the Levites. I would have you consider of it. I have no more to say to you." Franklin defended himself with ability, and showed that the citizens in town meeting were ready to pro-

ceeded to extreme measures with the inoculators but for his own cooler counsel and that of a few others.

It was on this occasion that Franklin closed one of his notices of the ministers with the following lines from a London paper :

“Thus P—sts, by strict rules,
May be called the edge-tools,
Which the people, *poor fools*,
Are forbidden to touch :
Be a villain, a traitor,
Affront your Creator,
Or glory in satire,
It safer is, much ;
Nay, be lewd, drunk, or swear,
Proud, covetous, as they ’re,
You may ’scape the holy snare ;
But if a P—st once you have thoroughly vexed,
He ’ll stick to you closer than e’er to his text,
You ’re plagued for ’t in this world, and d—d in the next.”

NOTE 29. (Page 170.)

“ But now, what is there to justify the virulent and unwearied endeavors of these wicked men to make them (the ministers) odious ? The only pretext they have is, that the ministers have intermeddled with civil affairs, and gone out of their line ; and the only instance they can give of this (for the others are only groundless surmises or open calumnies) is this : When the smallpox was first breaking out in the town, and every one foresaw and feared a dreadful mortality, these good men were apprised of a safe method, which they hoped, by the ordinary blessing of God, might be the instrument for saving many lives. This method came to them with very authentic recommendations ; nor was ever any remedy attended with a more uninterrupted and remarkable success than this. This they communicated to the physicians, urging them (not to put it into practice, as the ‘News Letter’ declares, but) to meet together and consult how far, or whether at all, it might be practised, and desiring they would proceed with mutual assistance each to the other, as God should direct them.

“ And to do some justice, by the way, to that eminent person, the learned Dr. Cotton Mather, Fellow of the Royal Society, who, to his honor, was the principal instrument in promoting this method among us ; and who now disdains to draw his generous pen for his own vindication, against the many foolish pamphlets that are pointed at him, and who changes not his temper for all their invidious calumnies. We will here transcribe the words with which he concludes his address to the physicians, dated June 6, 1721 :

“ I will only say (writes the doctor) that inasmuch as the practice of suffering and preventing the smallpox in the way of inoculation has never yet (as far as I have heard) been introduced into our nation where there are so many that would give great sums to have their lives insured from dangers of this dreadful distemper, nor has ever any one in all America yet made the trial of it (though we have several Africans among us, as I now find, who tried it in their own

country), I cannot but move it be warily proceeded in. I durst not yet engage that the success of the trial here will be the same as it has hitherto been in the other hemisphere; but I am very confident no person would miscarry in it, but what must most certainly have miscarried upon taking it the common way; and I would humbly advise that it be never made but under the management of a skilful physician, who will wisely prepare the body for it before he performs the operation. Gentlemen, my request is that you would meet for a consultation upon this occasion, and to deliberate upon it, that whoever first begins this practice (if you approve that it should be begun at all) may have the concurrence of his worthy brethren to fortify him in it.' Thus the Doctor.

"We appeal to the whole world whether this gentleman 'went out of his line' or did anything but what became a minister, a Christian, or a gentleman in his address. And this is all the blame they do with any color charge upon him, and which has given life to so many monstrous and bitter invectives against him.

"But to return from this digression. The physicians never met nor consulted about this method, according to the desires of the ministers, till one of them began the experiment on his own family. He had just reason to apprehend them in danger of being infected the common way. And here I cannot omit to observe the happy juncture of affairs that united to render this his attempt innocent and blameless. The worthy townsmen had taken the guards off the infected houses, and in effect proclaimed the infection so prevalent that 't would be in vain to strive to suppress it. By this act the nurses were commissioned to air themselves, who had been stifled, for a considerable time, by a close confinement with the sick. Liberty was declared to them to walk the streets; and now, as the necessities of the sick urged, these infected persons might go to our doctors upon any occasion, and any heedless or headstrong neighbors run in to visit their contagious friends, which must necessarily render their families very obnoxious to the distemper. This clearly evinces the imminency of the danger his family was in; and in a great measure vindicates his procedure. But, notwithstanding, a mighty storm was raised and a libel published, which, among other things, demanded an answer to a case of conscience. Six ministers of Boston undertook to give a proper answer to the demand, wherein they did some justice to the gentleman that that paper had unjustly reproached. After this the ministers were silent for several months, till at length the constant success of the experiment encouraged some of them to publish their sentiments on this subject, especially what related to the case of conscience. And here we think it very strange and ridiculous to see the satirists play the divine, and deny that it falls under the cognizance of our ministers, when so many people pretend conscience in the matter. This is to boast of their own divinity, as if they were the only proper judges of what is the part of a divine, and to counterpoint their own skill and judgment to that of our famous professors. But we will not ask who go 'out of their line' now. This is a full history of the crimes charged on the ministers, wherein they have 'gone out of their line'—that is to say, when they saw their people dying about them, and the dearest friends they had gasping for their breath, they did not cast off all bowels of compassion and be content that no further trial should be made of a method that they apprehended would deliver them from their danger."

The title-page to the foregoing pamphlet reads as follows:

"A Vindication of the Ministers of Boston from the Abuses and Scandals lately cast upon them in divers Printed Papers by some of their People. Matt. xxv.: 40: 'Ye have done unto me.' Boston, in New England: Printed by B. Green, for Samuel Gerrish. 1722."

NOTE 30. (Page 170.)

Drs. Roby and Thompson, whose successful cases of inoculation at Cambridge and Roxbury are reported in Boylston's tables, early became advocates of the practice. Dr. Nathan Williams, of Boston, who was esteemed an able practitioner of medicine, as well as an eloquent and influential minister of the gospel (a combination of professions very common in the early settlements of the American colonies), adopted the practice. He also published a pamphlet in defense of the practice of inoculation some time during the year 1721.

NOTE 31. (Page 175.)

Mr. Hutchinson died on the 30th of November, 1721; Mr. White died on the 10th of the following month. The Speaker, Mr. Clark, was a laborious physician, and it was supposed that in coming from the bedside of his patients suffering with smallpox, he had brought the infection with him to the Court. Hutchinson, in his History of Massachusetts Bay, p. 271, says, "The Speaker, Mr. Clark, was one of the noted physicians in Boston, and, notwithstanding all his care to cleanse himself from infection after visiting his patients, it was supposed he brought the distemper to his brother members, which so terrified the Court that after the report of his (Hutchinson's) being seized, it was not possible to keep them together, and the Governor found it necessary to prorogue them."

NOTE 32. (Page 177.)

Dr. Douglas says there were no accurate statistics taken during or after this epidemic, and we must therefore receive with some allowance his statement of 12 deaths among the 400 inoculated. It will be remembered that the ratio of deaths among the inoculated in 1721, when the practice was entirely new, was 1 to 47, and there is no reason to believe that the practice made a worse exhibit nine years later. But if we compare Dr. Douglas's estimate of the mortality from inoculation in 1721, when he asserted it was one in every 14, we must award him praise for his large liberality in placing the percentage nine years later at 33. The Doctor was candid enough, in 1751, to acknowledge that in 1721 he was a sort of novice in the smallpox practice, and had confided too much in Dr. Sydenham, an error which he had gradually corrected.—(See *Douglas's Summary*, vol. ii. p. 394.)

NOTE 33. (Page 178.)

An act of the Legislature had been passed, and remained upon the statute book late in the century, prohibiting inoculation. For when Dr. Benjamin Gale, of Connecticut, wrote his "Memoirs of Inoculation in New England," which were published by the Royal Society, he complained of the embarrassing effect of this law upon the people of Massachusetts. So far as I can discover, Massachusetts was the only one of the American colonies that passed laws prohibiting inoculation. Others, however, had laws regulating the practice. Her seafaring men and youths residing in or resorting to seaports and large towns, were by the nature of their business greatly exposed to the contagion of small-pox, and having faith in the utility and safety of inoculation, were forced to go to New York or Philadelphia, as they did in great numbers, to receive it in that way. But these expert legislators finding that this law was evaded, and that the people sought elsewhere the protection which inoculation afforded, passed an additional act, with a severe penalty, prohibiting any person returning to the colony within twenty days after he had left an inoculating hospital; and, in case another received the disease from such, he should be made to pay treble the expense incurred in consequence.

NOTE 33. (Page 180.)

The inoculating hospitals established in accordance with this grant are said to have been the first for this purpose in the State. They were located in the vicinity of Boston, and were opened to the public in 1764. One was erected on Point Shirley by William Burnett, from New Jersey, and another at Castle William by Samuel Giltson, from Nantucket. They were attended by Sylvester Gardner, Nathaniel Perkins, Miles Whitworth, Jonas Lloyd, Joseph Warren (afterwards General Warren), Benjamin Church, Thomas Bulfinch, and Joseph Gardner.—(See *Boston Gazette and Post Boy*, 1764.)

NOTE 34. (Page 181.)

Professor Waterhouse observes, in a letter to Dr. Haygarth, dated October 28, 1788, that "There are perhaps 156 under inoculation at present, not one of them paupers. They are principally children—perhaps thirty or forty of them children of the first people of the Commonwealth. The charge of the whole process is eight dollars, or thirty-six shillings sterling, including every expense, from the incision to the dismissal, which is usually three weeks. In some places they inoculate for half that sum. You must conceive the whole of this business conducted with a good deal of gayety, when the patient if ill is apt to be pitied as if he were on a sailing party and sea-sick. Neither do I think are the music and little ceremonies of parade totally useless. An established system of mirth and good humor contributes not a little to their welfare."

NOTE 35. (Page 181.)

Felt, in his Annals of Salem, quotes from a paper of that day the following notice in connection with the outrage: "On the 25th of the next month (February) two men of the town, being suspected as concerned in the outrage, were confined in our prison. In the evening a company of four or five hundred persons from thence came to rescue the prisoners and carry them home. And military companies are ordered to prevent this, but to no effect. March 1, by command of the High Sheriff, his deputy assembles several hundreds of men with arms, for recovering the two prisoners and seizing the principals concerned in the rescue. In the meantime a large body are prepared at Marblehead to resist this force. The proprietors of the consumed hospital, to prevent a collision between these two parties, agree to give up the prosecution for damages."—(See vol. ii. p. 435.)

NOTE 36. (Page 182.)

Marshall, in his Life of Washington, after calling attention to the distressing condition to which our army had been brought by the prevalence of smallpox, says: "As the only effectual method of avoiding a return of the same evils the ensuing campaign, the General determined to inoculate all the soldiers in the American service. With as much secrecy as could be observed, preparations were made to give the infection in camp, and the hospital physicians at Philadelphia were to carry all the Southern troops, who were for that purpose stopped at that place and its neighborhood, as expeditiously as possible through the disease. Similar orders were given to the physicians at other places; and thus was prepared for the ensuing campaign an army exempt from the fear of a calamity which had at all times endangered the most important operations. The process in camp was so conducted that no advantage of it was taken by the enemy, and the example given in the army was fortunately followed very generally throughout the country, so that this alarming disease in a great degree ceased to be the terror of America."—(See *Marshall's Washington*, vol. iii. pp. 69, 70.)

NOTE 37. (Page 182.)

"The officers and soldiers of the American army were about this time (January, 1777) inoculated in their cantonments at Morristown. As very few of them had ever had the smallpox, the inoculation was nearly universal. The disorder had previously spread among them in the natural way, and proved mortal to many; but after inoculation was introduced, though whole regiments were inoculated in a day, there was little or no mortality from the smallpox, and the disorder was so slight that from the beginning to the end of it there was not a single day in which they could not, and, if called upon, would not, have turned out and fought the British.

"To induce the inhabitants to accommodate officers and soldiers in their houses while under the smallpox, they and their families were inoculated gratis by the military surgeons. Thus in a short time the whole army and the inhabitants in and near Morristown were subjected to the smallpox, and with very little inconvenience to either."

NOTE 38. (Page 183.)

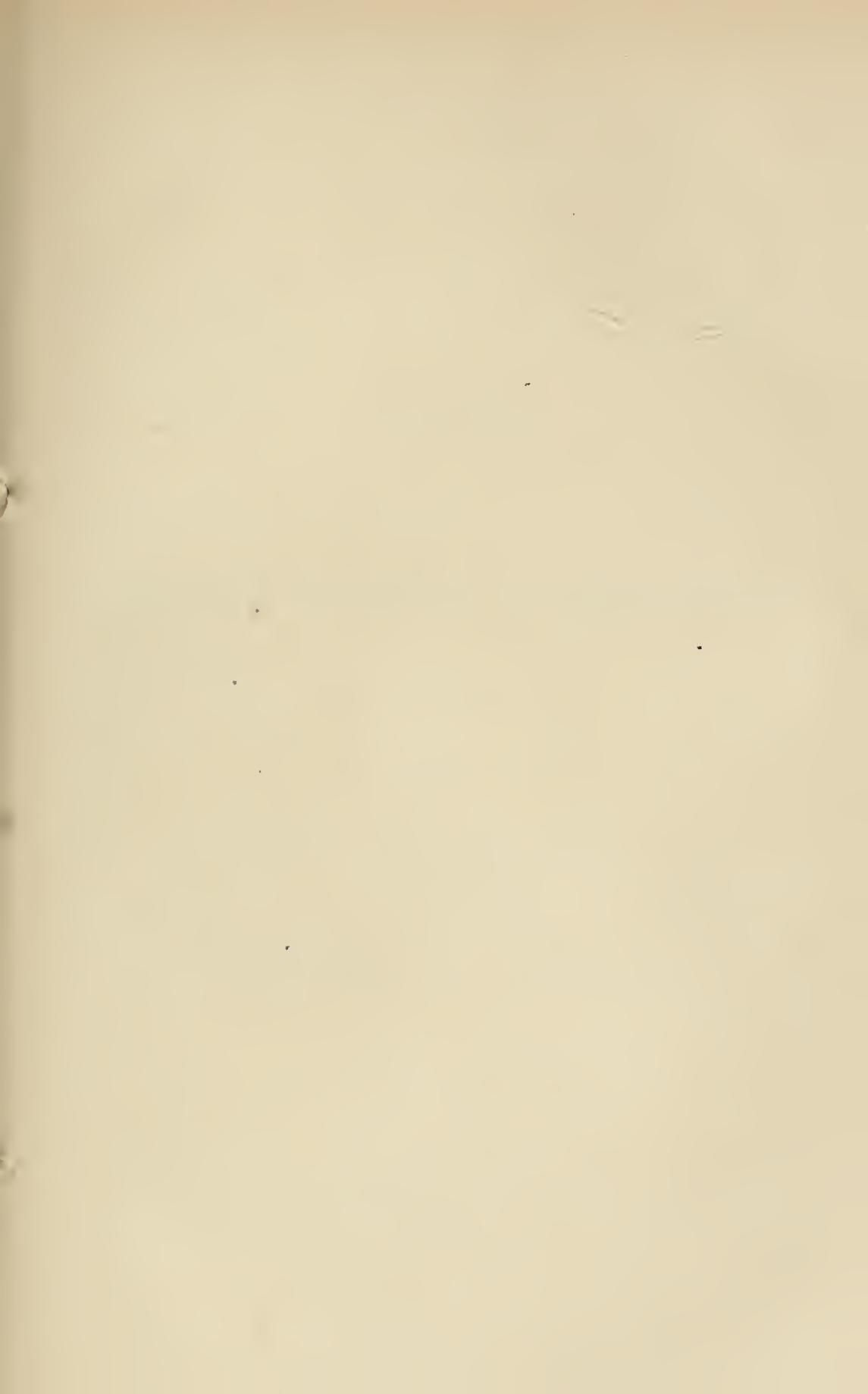
This law permitting hospitals for inoculation purposes to be built, caused one to be erected in Watertown, another in Newtown, and also one in Medford and Brookline. The latter place is scarcely three miles from Boston, and an equal distance from Cambridge, where there was a similar institution. The chief inoculating hospital of the State was the one at Brookline. This was under the joint management of Drs. Isaac Bond, William Aspinwall and Samuel Hayward, by whom more than three thousand persons were inoculated in one year, with but very slight mortality.—(See *Thatcher's History of Medicine*, p. 23.)

Dr. Waterhouse says: "The buildings for inoculation are situated on a point of land called Sewell's Point, which juts out into Charles river. This point is not a bleak sandy beach, but ornamented with trees, pleasant walks, and green banks, and is a mile and a half from the common road."

Inoculation had become so general in 1776-'77-'78 throughout the States that, according to the reports of that day, scarcely four in a hundred of the male population remained without protection. This fact was substantiated at the yearly militia musters, where it was found to be fully verified on actual inquiry. Whether it would have been true among the whole population we cannot say, but think it doubtful.

NOTE 39. (Page 183.)

Dr. Waterhouse, in alluding to the subject at a later day, says: "The inhabitants of New England view the smallpox with singular dread; not that they ever suffered any remarkably desolating visitation from it, but the malady has been kept at an awful distance by restrictive laws and still stronger popular impressions, so that in New England, the most democratic region on the face of the earth, the priest, the magistrate and the people have voluntarily submitted to more restrictions and abridgments of liberty to secure themselves against that terrific scourge than any absolute monarch could have enforced."



CASES
OF
TRICHINA SPIRALIS IN SPRINGFIELD.

REPORTED BY
M. CALKINS, M.D.
OF SPRINGFIELD,

AND READ JUNE 5, 1867.

CASES OF TRICHINA SPIRALIS.

In the family of Mr. Hall eight cases occurred which I did not have the opportunity to investigate. Of these, one died; and, with others, I made a microscopic examination of the portion of a muscle taken from the body of the deceased. It was full of living trichinæ. No complete autopsy was permitted by the friends, and the small piece of muscle, from the peronæus longus, was obtained after much solicitation by Dr. Gardner. These cases are reported in the Medical and Surgical Reporter of May 4th, 1867, by the family physician.

I have seen four cases in the later periods of the disease, and have obtained the history of another from the attending physician, Dr. W. W. Gardner, of this city. The infested ham by which these cases were produced was examined by several medical gentlemen, with magnifying powers varying from 75 to 250 diameters, and found laden with the encysted trichinæ.

A brief history of the cases of which I have knowledge may be of interest to the profession as illustrative of the effects of a parasite which, until recently, has not been thoroughly studied. The first case, that of Mr. John Norton, shows in a very marked degree the peculiarities of the disease, as they were communicated to me by the patient and friends.

On the evening of Thursday, the 7th of March, about 9 o'clock, Mr. Norton ate four ounces—as nearly as he can

estimate the quantity—of raw ham, afterwards proved to have been laden with the parasite. About 3 o'clock in the morning, he was attacked with severe pain in the stomach, nausea, vomiting and diarrhoea, with a burning sensation extending through the stomach and abdomen. The next morning he took an active cathartic, and was able to attend to light labor for about two hours in the Armory, but was compelled to return to his house on account of the sickness in the stomach and general indisposition. On Saturday he attended to light labor all day. On Sunday, occupied the bed. On Monday, Tuesday and Wednesday, he attended to his usual occupation, but with great difficulty. On Thursday, the eighth day after eating the raw ham, he was so weak as to necessitate the discontinuance of all labor. Medical aid was sought, and an emetic prescribed, but the nature of the case was not apprehended. On Friday, the ninth day, he had severe distress in the epigastrum, extending more or less over the abdomen, pain in the back, head and eyes, attended with great muscular weakness. On Saturday, the tenth day of the disease, the patient was no better. The eyes were injected, and the lids and face oedematous, the headache severe, cramps in the legs and arms, the slightest motion being followed by severe pain. The eyeballs felt as if pressed full, with great difficulty in turning them from side to side, and especially in turning them upward. There was loss of power in the muscles of deglutition, difficult mastication and stiffness in the muscles of the cervical region. There was a burning or tingling sensation in the muscular parts of the limbs and trunk of the body, also much dysphonia. On Sunday, the eleventh day of the disease, he was decidedly worse, and the muscular prostration very intense. On Monday, the twelfth day, had less pain, but still more prostrated. On Tuesday, the thirteenth day, the renal secretion passed freely. The pain was absent, but the extreme muscular debility remained. On Wednesday, the fourteenth

day, had no muscular power; none on the fifteenth day. On the sixteenth day could stand when the limbs were perpendicular, but not otherwise. The respirations were rapid and laborious. On Saturday, the seventeenth day, was able to sit up and walk a few steps.

In three weeks after eating the infested ham the patient returned to his labor, which was very light, requiring but little muscular exertion. On the 15th of April, five weeks from the time of eating the ham, the legs were œdematosus, the abdomen tympanitic, and the patient much harassed by a watery diarrhoea, and suffered much from general muscular debility.

It will be observed that this patient took an active cathartic the next morning after eating the infested meat, which, no doubt, carried off a portion of the parasites, and thus to some extent modified the subsequent effects.

CASE II. Miss Jennie Pattison, sister-in-law of Mr. John Norton, ate, at the same time, of the same ham, about an ounce, raw. Like the first case, she suffered from nausea, diarrhoea, and gastric pain, on the next morning and during the day. On the seventh day after she was taken ill with headache, fever, conjunctivitis, photophobia, œdema of the eyelids and face, soreness and pain in the cervical and dorsal muscles, with soreness and cramps in the most muscular parts of the limbs and trunk. Dyspnœa, dysphagia and pharyngitis were also present. Being away from home when attacked, the symptoms, especially the œdema, swelling of the face and conjunctivitis, were thought to indicate the accession of erysipelas. In from one to two weeks after eating the infested ham the symptoms were most fully developed. On the fifth week after the introduction of the parasite, the time of my seeing her, she suffered from general muscular debility, œdema of the limbs, pharyngitis, and anaemia.

In this case the small amount of meat eaten did not produce the symptoms in a degree so marked as in the former case.

CASE III. Mr. William H. Gragg ate some two pounds of infested raw ham in small portions, and at intervals, from the 25th of February until the 7th of March. He gradually grew ill, suffered from muscular pain, great muscular weakness, inflammation of the eyes and lids. In two weeks after eating the larger part of the raw infested ham, being a portion of the same one from which the other cases had eaten, he had severe pain in the muscles, especially in those of the back and limbs, and eyes. Says his eyes at this time felt as "hard as bullets," and that all rotary motion of them was very painful and difficult. These symptoms, with the usual variation, continued from the second until the sixth week, when he still had great muscular debility, almost verging on paralysis. On the eighth week after, he was able to attend to his ordinary occupation, that of a tailor.

The gradual introduction of the parasite in this case modified the symptoms, by giving one brood time to become encysted before another was developed from the immature parasites introduced in the raw meat. Had the whole quantity of ham eaten raw been introduced into the stomach within two or three days, the result would, no doubt, been much more serious, and, probably, fatal.

CASE IV. Mr. S., on the night of the 7th of March, while at the grocery store, was asked to taste, with a view to ascertain its qualities, of a ham, from which another gentleman wished to purchase a portion for his family. He cut off a small piece—about an ounce—and ate it raw. In about a week he became ill with the same symptoms as the other cases presented. Dr. W. W. Gardner, the attending physician, at first was suspicious that it was trichiniasis.

But the patient concealed the fact of his having eaten of the infested ham. But subsequently it was proved by several reliable witnesses, and, better still, by the acknowledgment of the fact by the patient, that he had eaten of the same infested raw meat that had caused the disease in others. Dr. Gardner frankly told the patient, before he knew that he had eaten of the infested meat, that he could not explain the symptoms presented on any other hypothesis than that of the existence of trichiniasis. He gradually recovered his health, with the exception of suffering from muscular debility.

CASE V. Mr. Fancher purchased from six to ten pounds of the same ham from which Mr. Norton, Miss Pattison and Dr. Gardner's patient ate. The largest part of it was boiled and eaten without detriment by the family, but Mrs. Fancher ate a small piece raw and quite a large amount imperfectly broiled. The same result followed as in the other cases—nausea, vomiting, diarrhoea, pains in the muscles, swelling of the eyelids, photophobia, dysphagia, great muscular prostration, formication. After the fourth week she gradually improved, but has suffered from muscular debility and diarrhoea.

The conclusions which may be inferred from these cases are such as have been arrived at in other cases both in Europe and America: that the parasite is destroyed by thorough cooking; that its effects are materially modified by the quantity taken at one time; that the slower the parasite is introduced into the muscular tissues the less violent the symptoms; that the acme of the disease, when a large quantity of the infested raw ham is eaten, occurs in about twelve days; that in from three to four weeks the severe symptoms subside, the time at which the parasite becomes completely encysted; that the remote effects are largely due to injury of the muscular tissues; that the parasite does not cause a

large mortality in those attacked, there having been in Springfield thirteen cases and one death—a proportion very nearly like that recorded as the result of the disease in other parts of the world; and that medical treatment is useful in the first stage only so far as it can cause the expulsion or destruction of the parasites by emesis, catharsis and anthelmintics; and after the parasites have migrated into the muscles, only so far as it can sustain the vital forces in bearing the burden temporarily imposed upon them by the presence of millions of organized beings, drawing their nutrition from the common source of supply to the muscular tissues of the body.

THE LESSONS OF THE WAR

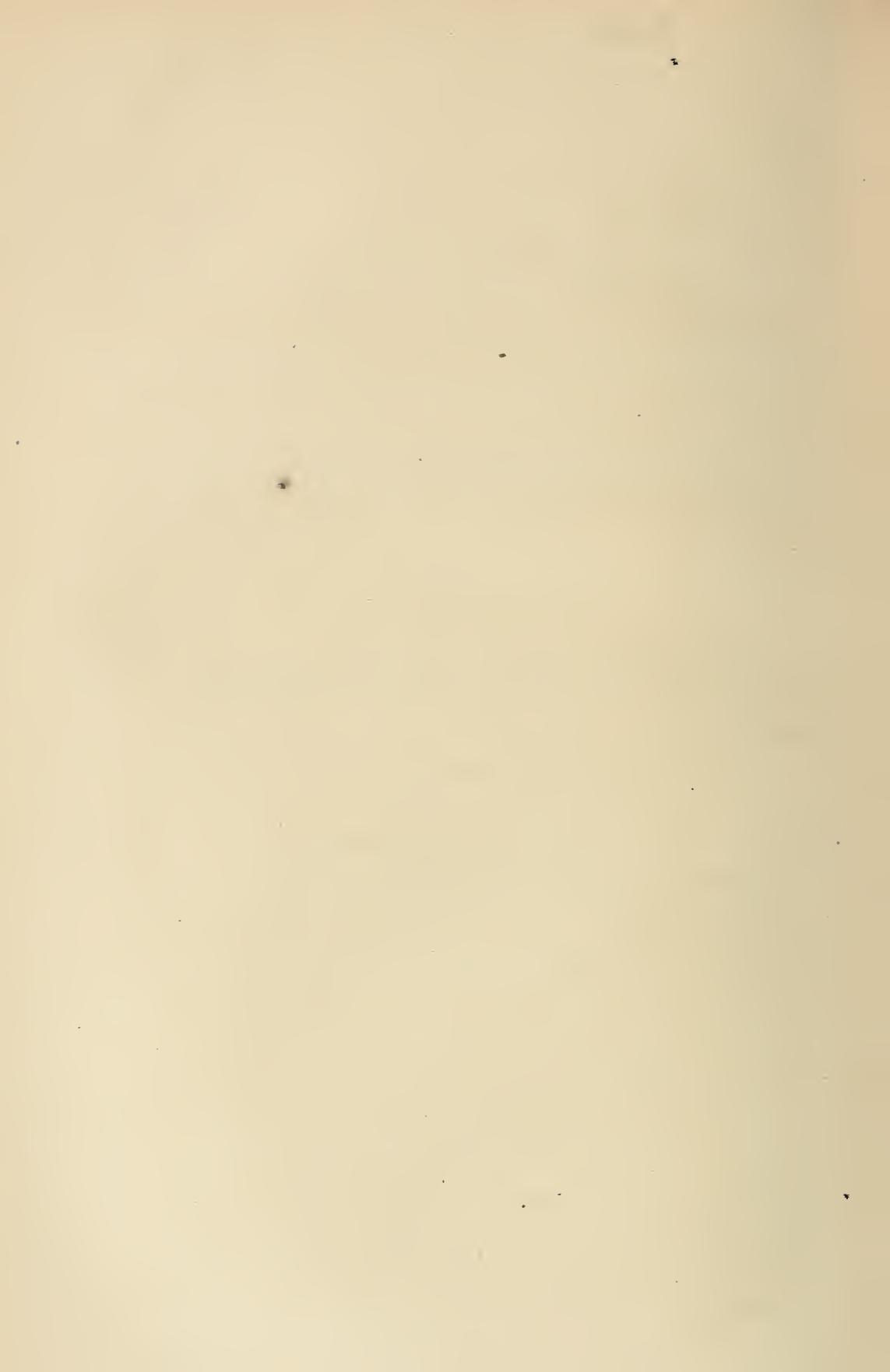
TO THE

MEDICAL PROFESSION.

BY GEORGE DERBY, M.D.

SURGEON BOSTON CITY HOSPITAL. LATE BREVET LT.-COL. AND SURGEON U. S. VOL'S.

READ JUNE 4, 1867.



THE LESSONS OF THE WAR TO THE MEDICAL PROFESSION.

I PROPOSE, in the remarks which I have the honor to present to the Massachusetts Medical Society, to review, as briefly as possible, some of the points in which real additions have been made to the knowledge of our profession by the experience of the recent war. In so doing I will speak not only of surgery, but will ask your attention to the means employed for preserving the health of the army, and particularly to the construction of hospitals. With your permission I will also refer, somewhat informally, to other matters which, during four years service in the army, have come under my observation, and which seem worthy of remembrance. The surgical and medical history of the war, based upon statistical data of the broadest and most complete character, is now in active preparation at the office of the Surgeon General in Washington, and will, at no very distant day, be given to the world. Meanwhile, under the modest title of Circular No. 6, we have already received an account of the enormous mass of material which it will include, and have learned some of the interesting results which are distinctly foreshadowed. To these I shall refer as the highest authority we have upon certain important questions. There is also another class of subjects which cannot be reduced to statistical form, and for these I must ask you to allow me to give impressions and belief founded upon personal observation.

I suppose the general feeling among those who, at the beginning of the war, found themselves suddenly transformed from civil practitioners into army surgeons, was something like this: We will study Army Regulations and learn the rules of the service as fast as possible; establish friendly relations with officers and men, and preserve their lives and health by hygienic rules and counsel; avoid all unnecessary operations, and by all means practise what we have learned about conservative surgery to the utmost extent.

These anticipations were not all fulfilled. Fortunate was the man who quietly submitted to the inexorable Regulations, who tried no new and original plans for the execution of his duties, and who did not vex his spirit and impair his usefulness by scolding at red tape.

Friendly and pleasant relations with officers and men are completely in the power of the surgeon, and this for several reasons.

First. Because no man knows but that his life may be at the Doctor's disposal at any moment, whether he wills it or not.

Second. Because, by the wise and admirable provisions of the service, the medical officer has full and complete authority, which not even the Commander-in-Chief may gainsay, to excuse from duty, by reason of sickness, any one he thinks proper.

Concerning the preservation of health by hygienic precautions, our most sanguine hopes were fulfilled. The authority to mend abuses was not, as in the case of sickness, absolute with the surgeon, and could only be exercised through commanding officers; yet, with a little care and discretion, it could almost always be freely exerted.

Of the practice of conservative surgery for gunshot injuries, I can say in general terms that it led to disappointment. So far is it from being true that we amputated unnecessarily, I believe the error, at least in the early period of the war,

was in the other direction. Immediate amputation in very many cases of broken limbs, which a vain attempt was made to save, would have resulted in the preservation of life. I say immediate and not primary amputation, and this is one of those points which statistics do not make clear, since the division is universally drawn between primary and secondary operations; the period during which the former may be practised including two or three days. The difference between the chances of recovery of a man whose leg or arm is amputated within an hour or two of his injury, and one whose case is deferred twenty-four or forty-eight hours, even although irritative fever has not been set up, I believe to be very great. Why this is so, is not completely evident, but of the fact I am well convinced. Perhaps the mental condition may explain it, at least in part. A man who has been hit in battle is in a state of *mind* to bear immediate operation, if the surgeon so decrees. He is elated, proud of his wound, surprised that he was not killed outright, and ready for anything. The shock to the nervous system which we observe in railroad accidents, and unexpected and inglorious injuries, seems to be counteracted by this state of mind, and has never, within my observation, been a bar to immediate action on the part of the surgeon at the field hospital. Indeed, if the opportunity is then lost, it may in certain cases never return. The next day, after a sleepless night, the mental and bodily conditions are less favorable. If the man passes the Division Hospital without operation, he arrives in due time at the General Hospital, remote from the field. Here the surgeons are less busy, and if the case is one of broken thigh, or leg, or arm, it is, perhaps, amputated, or the attempt to make the splintered ends unite is continued. In either case the chance of recovery is far less than if immediate amputation had been practised.

The results of conservative surgery, applied to fractures of the femur, are thus given in Circular No. 6:—Whole

number treated without amputation, 1761: recovered, 321; died, 796; undetermined, 644. It will be observed that the number of undetermined cases at the date of report (Nov., 1865) is very large. The records of civil hospitals since the close of the war show that many of the cases which had seemed to terminate favorably have not in reality done so, but have required frequent removal of dead bone. This is not readily done; in fact, it is a difficult and perilous procedure to remove portions of the shaft of the femur, and when successfully accomplished is often discovered to be not final and conclusive. The same trouble recurs, and after repeated operations the patient has not infrequently died after months and years of suffering. Cases of complete and permanent recovery are certainly rare, and from the return of the men to civil life their number cannot be definitely fixed by the army reports. My own belief is, that in gunshot fracture of the femur, in either the lower or middle third, immediate amputation should be the rule. In fractures of the upper third it would depend upon the amount of comminution and the condition of the great vessels, but even here, in a majority of cases, immediate amputation would, I think, give the best chance for the preservation of life. The same rule of immediate amputation is equally applicable to gunshot injuries of the knee and ankle, and almost equally so to fractures of the bones of the leg.

In gunshot fractures involving the shoulder joint, great and positive additions to surgery have been made in the late war. More than 800 cases have been treated by excision, and with a less mortality than when amputation at the joint was practised. Up to November, 1865, 575 cases of excision of the shoulder joint were reported: 252 primary, and 323 secondary. The mortality of the first was 23 per cent., of the second 38 per cent. Since that date more than 200 additional cases have been reported. In the Crimea the French army had 38, and the English 16 cases. Our surgeons have

demonstrated the advantages of this operation both in the preservation of life and limb. That the arm is useful, we have abundant evidence in the ability to write, and, indeed, to use the hand with power and effect, which is now often witnessed, and in the numerous photographs of the Army Medical Museum. That subsequent operations for the removal of dead bone are not unknown is certainly true, but the same occurs after amputations, and the operation in the case of the arm is usually neither difficult nor dangerous.

Of other excisions it may be generally stated that their results have been less successful than those of the shoulder joint. Of the wrist, very few were practised. Of the elbow, 315 cases are reported, with a somewhat greater mortality than from amputations of the arm. Excisions of the knee joint were seldom made, and the results were unfavorable. In 32 instances excision of the head of the femur was practised, and in 4 cases recovery followed. When we remember that previous to our war only 12 instances of this operation for gunshot wound were on record, and with but a single recovery, the report of our surgeons may be regarded as highly satisfactory. Of excisions in the continuity of the long bones of the extremities, no favorable report can be made. The mortality was greater than from amputations, and this experience corresponds with that of recent European wars. Amputation at the hip joint was done 21 times, and in three instances recovery followed.

Anæsthetics were universally used in our army; chloroform alone in the field, as ether was too bulky and inflammable for transportation. I have never known or heard of an instance in which our surgeons had not a supply at hand sufficient for all their needs.

Of the ambulance system I would say that, after many trials and frequent failures, it was brought in the last two years of the war to a condition very near perfection. Nothing could be more admirable than the manner in which the

wounded were taken from where they fell to the field hospitals, and thence, together with the sick, to the base hospitals, in the Army of the Potomac in 1864. Officers and men engaged in this special duty were of the bravest and best; picked men, proud of their department, and fully understanding its peril to be equal to that of serving in the ranks. No provisions which could then be suggested for the comfort and safety of the wounded and sick were omitted. Such provisions, however, were necessarily limited by the strength and solidity of the ambulances required to pass over the horrible roads.

In the recent European war a very simple arrangement was used by the Prussian army, which seems to have been never thought of in ours. Its usefulness is apparent on the mere statement, and had it been suggested to the Surgeon General I do not doubt it would have been at once adopted. This is a system by which wounded men are ticketed by the first surgeon into whose hands they may happen to come. A card, stating the nature of the injury and signed by the surgeon, is attached to the man's clothing. This plan would have saved much time and suffering, as otherwise every wounded man was liable to be examined unnecessarily.

The ability of both wounded and sick to bear transportation was a constant subject of surprise to our medical officers. Here again I cannot doubt that the mental condition of the sufferers, who knew they were going to a place of safety, combined with an abundant supply of fresh air, were the influences which enabled them to bear with impunity such hard usage as would, under other circumstances, have been fatal. The inestimable value of an unlimited supply of fresh air to our wounded and sick was, indeed, a subject of daily observation. It often happened, for instance, that a farm house and outbuildings were used for several days as a temporary hospital. In these cases the occupants of the piazza and horse sheds, and similar places, with only a shelter

from the sky, did better than those who were provided for within the house.

Let me ask your attention to another lesson of the war which seems to me well worthy of remembrance. We have, unhappily, evidence enough in our homes of the loss of life among those who served in the army. But there is another view of the subject equally striking and instructive, in which our profession may feel a just pride. I refer to the number of those who have been saved from death by disease through a hygienic system which the spirit of the age, the enlightened and generous provision of the Government, and the watchful and constant care of the Medical Department, have conspired to create and keep alive. The idea of war generally entertained in times of peace has been of a succession of combats, and of men killed and wounded. No very distinct perception seems to have been had before our great struggle, or perhaps, I should say, until the close of the Crimean war, of the possibility of warding off epidemics, and of anticipating and averting the attacks of disease which all experience has shown to be far more destructive to armies than the fire of the enemy. Of the wars of the first Napoleon we know on this point only that the losses by disease were enormous. It was not the policy of rulers in those days to tell the world how many men they sacrificed, nor was sanitary science at all understood. In our Mexican war between 10 and 11 per cent. of the force engaged died annually from disease. The Allies in the Crimea lost at least 25 per cent. annually by disease. In our recent war the loss by disease in the first year was 49 in a thousand. In the second year, 65 in a thousand. In the third and fourth year the ratio is reported by the Surgeon General's office as not greater than in the first and second. The records are not yet completely analyzed, but enough is known to warrant this statement. We have, then, an annual loss of about six per cent. by disease, and this while campaigning in a country full of malarious

influences, and where fever is as rife among the inhabitants as anywhere within the boundaries of the United States. It will be seen at once that had our deaths from disease been in the ratio which previous experience had given as the rule of war, their number in four years would have been appalling. It can be no exaggeration to say that the number of lives preserved—lives which, according to the usual mortality of war, would have been sacrificed—was greater than the whole number of lives lost both by disease and battle.

Looking at these facts as medical men, we find them not accidental, but the direct and logical consequence of the rules of hygienic science as applied to war. The military necessity which compelled our armies to be in constant movement, and which kept them for the most part in the open country and away from large towns, had much to do with their exemption from epidemics, as well as from syphilis and other diseases which follow the excesses to which soldiers are prone; but these influences alone could never produce such results. What has been done, and is now doing successfully in the great cities of Europe to diminish disease and prolong life, has been even more successfully practised, and for the first time in military history, for armies in the field. Good and sufficient clothing, clean and well drained camps, abundant food and plenty of coffee, unlimited exposure to sun and air, and hospitals perfectly ventilated, have produced their legitimate results. To the attainment of these great ends, all departments of the Government have contributed, but the Medical Department first and chiefly. The neatness of our camps might indeed give a useful hint to Massachusetts farmers whose sinks, house drains, privies and adjacent premises would often be the better for such “policing” as a Medical Inspector would require for a soldier’s quarters, and no one can doubt that the family health would be correspondingly improved. Other things being equal, it was found in our army that the regiments

best disciplined, whose officers and men were most proud of their neatness and order, whose camps were cleanest, and whose cooking utensils were brightest, were most free from disease.

In the early period of the war, the only hospitals known in our army beyond the tents provided for regiments grew out of the necessities of the case. No large provision was made for the shelter of the sick and wounded. Consequently all sorts of expedients were improvised by medical officers under the authority of local commanders. In this way houses, barns, churches and warehouses came to be used as hospitals. Where lumber was attainable, rude and temporary buildings were put together in such form as the surgeons desired. Hence a great number of models were furnished for comparison, and from these rude beginnings grew, not from any single mind, but by the conjoined labor and experience of the Medical Department, a plan of hospital construction more extensive and far more perfect than had before been known, and which, when its usefulness was proved, was adopted by the War Department and required to be exclusively used by medical officers. The value of this experience in hospital construction seems to be inestimable in civil as well as military service, and I desire to bring to your notice the distinctive features of a plan which combines in the simplest form all that is necessary, and, I am almost inclined to say, as much as is useful, for the proper care of the sick when brought together in large numbers for medical and surgical treatment. The foundation stone of this plan is the supply, under all circumstances, in summer and winter, in all kinds of weather, and by the simplest possible means, of an abundant supply of fresh air. The second great principle involved is the separation of different parts of the hospital, so that infection may not be carried from one ward to another. All other details are unimportant and not essential to the working of the plan. The first of these objects

is attained, in a way which I will presently describe, by making the buildings used as wards one story high; and no deviation from this rule is possible. The wards are detached and separate structures, and each at a distance of at least thirty feet from any other. The length of these wards may vary with the extent and shape of the ground to be occupied, but I shall give that which was ordered for the United States General Hospitals. The other dimensions are fixed and invariable. Length, 187 feet; width, 24 feet; height, 15 feet from floor to eaves, and 19 feet from floor to ridge. The floor elevated 18 inches from the ground, with free ventilation beneath it. A door at either end, and, if convenient, one on either side also. Sixteen windows on each side. A ward of this length contains sixty beds, with an allowance of more than a thousand cubic feet of air space for each patient. Ventilation is provided in summer and winter in the following manner:—The ridge of the building is open in its whole length, but provided with an outer cap or cover projecting over the edges of the opening and raised a few inches above it. This false ridge is provided with shutters, by which a partial or complete closure can be made. Air is introduced in summer through gratings in the floor, and by the windows and doors, and finds free exit above in the whole length of the building. In winter the shutters in the ridge are closed. Air is then introduced through the gratings before mentioned, directly over which are placed stoves, which may be of any pattern for burning either wood or coal. Eight feet distant from each stove is a vertical wooden shaft 18 inches square passing through the roof, where it is properly capped, and coming down to the level of the tie-beams, where it receives the smoke pipe, which passes through its whole length. A powerful upward current of air is thus produced. This mode of ventilation has been tested in all the varieties of climate which our country affords, from Maine to Louisiana, and has been found perfectly efficient. The only modifica-

tion required by the extreme cold of New England is the closure of the space beneath the wards, and the introduction of air by horizontal shafts, as we supply our furnaces.

The wards are connected with each other, and with the buildings used for cooking, washing, storage, and general administration, by covered walks having floors but no sides. A portion of either end of each ward may be partitioned off for rooms for nurses, and for water-closets.

Never before have military hospitals been so free from diseases generated within themselves as those just described. They are now disused and demolished, but the lessons which they teach, let us hope, will not be forgotten.

THE PATHOLOGY AND TREATMENT

OF

VAGINAL CYSTOCELE.

BY JOHN HOMANS, JR., M.D.

OF BOSTON.

READ JUNE 4, 1867.

VAGINAL CYSTOCELE.

THE name "Cystocele" is derived from two Greek words, *Kυστις*, bladder, and *Κηλη*, tumor, and signifies a bladder-tumor. The affection is not a common one. Perhaps the term cystocele ought to be restricted to those hernial sacs, which, containing more or less of the parietes of the bladder, push through some of the superjacent tissues. Such herniae of the bladder occur at the abdominal ring, at the crural arch, in the perinæum, and at the thyroid foramen, being most common at the abdominal ring. There is another condition of parts to which the term cystocele has been applied. It consists in a relaxation of the anterior wall of the vagina, which permits the bladder to descend below its normal anatomical level; in this affection there is no real hernia, no perforation of any ring, muscle, or canal. The real pathological lesion is a prolapsus of the anterior wall of the vagina; but prolapse of the vaginal wall does not necessarily convey the idea that the bladder is displaced, and it is this displacement of the bladder that constitutes the essential characteristic of vaginal cystocele. This condition of the parts may be the result of many and severe labors, during which the walls of the vagina may have been greatly stretched, and have never afterwards recovered their normal state of tension. Habitual over-distension of the bladder may produce it. A violent cough often accompanies and aggravates it, as does constipation also in almost every instance. Laceration of the perinæum may predispose to

it; the effect of the giving way of the posterior vaginal wall being to throw too large a share of the weight of the abdominal viscera upon the anterior wall. Too soon getting up after delivery sometimes causes it. The pressure of the child's head upon the vaginal wall, distended by a bladder full of urine, might cause so much stretching of the tissues, that a state of permanent relaxation, not only of the walls of the vagina, but also of the attachments of the bladder, may be the result, and this viscus, instead of remaining in its normal anatomical position, behind the symphysis pubis, may fall downwards in a greater or less degree, sometimes distending the vagina and filling its outlet, sometimes protruding between the external genitals. Of course the constitutional effect of this state of things will vary with the amount of prolapsus of the vagina and bladder, or of the uterus, which is also often found to be prolapsed in cases of cystocele. A slight bulging out would probably not cause any great amount of disturbance, while such a state of relaxation as would permit the bladder (always covered by the vaginal wall) to protrude beyond the external parts and hang down between the thighs, would cause almost ceaseless misery. A symptom first noticed by Sir Charles Mansfield Clarke, and said to be very distressing, is a painful feeling of dragging from the navel, probably to be explained by the stretching of the remains of the hypogastric arteries, which constitute in the adult the urachus, one of the anterior ligaments of the bladder.

Vaginal cystocele, if unrelieved, tends to grow worse as time runs on. At first there may be only a slight bulging downwards; this allows a small cup-shaped portion of the bladder to be more dependent than the remaining floor of the organ, and to form a reservoir for the accumulation of urine; at first this accumulation is small in amount, but gradually increases, and, by its weight, tends to drag the bladder lower and lower, and make micturition more and more diffi-

cult. This may go on to such a degree that the bladder cannot be emptied without first elevating the tumor; the meatus comes to be almost, if not quite, external to the labia, and the course of the urethra, instead of being upwards towards the posterior part of the pubes, is downwards and backwards towards the perinæum. A catheter, entering at the meatus urinarius, passes downwards, and its beak is felt near the fourchette; or the urethra may be bent at a right angle, and while the first half inch may be normal in its direction, the rest of its course suddenly bends downwards, dragged by the weight of the bladder, and the instrument cannot be introduced without elevating the tumor.

The diagnosis of vaginal cystocele is not difficult. From a prolapsed uterus it can be distinguished by the absence of the os tincæ, and by the softer feel of the tumor; the introduction of the catheter would also settle the matter. From an inverted uterus, and from prolapse of the posterior wall of the vagina (rectocele), it can be distinguished by the introduction of a catheter, which would settle, either that the tumor was the bladder, or that the bladder occupied its normal position.

The treatment of cystocele has for its object to restore the bladder to its proper level, and to maintain it in its normal position. Sir Charles Clarke recommends the wearing of a hollow globular shaped pessary to support the tumor, and the daily use of astringent injections. Bedford recommends the use of a sponge pessary, or an India rubber ball, and also advises astringent injections, and in some cases a narrowing of the cavity of the vagina. Churchill recommends astringent injections, and the use of a thick wax candle as a pessary, or a roll of linen, or a hollow curved pessary with its concavity towards the bladder. "Marshall Hall (Baker Brown, Surgical Disease of Women) recommended to remove a triangular slip of the mucous membrane, the base being towards the orifice of the vagina, and

to bring the edges together by sutures, and thus to contract the calibre of the vagina." Jobert (de Lamballe) (*idem*) applied caustic around a more or less considerable oval space on the posterior surface of the vagina, so as to form an isolated spot, and repeated the application of the caustic till the mucous membrane was destroyed. He then pared the edges of the sore with scissors or a bistoury, drew them together, and maintained them in apposition by means of straight needles (the points of which were removed) and a twisted suture. He operated thus on three patients with success. Erichsen advises in some cases a plastic operation for narrowing the vaginal orifice by lengthening the perineum.

Mr. Baker Brown remarks (Surgical Diseases of Women, p. 97), "Recognizing the prolapse of the bladder to be due to the relaxation of the anterior wall of the vagina, I endeavor to remove this cause by a 'plastic' operation." The operation recommended is as follows: The bowels having been emptied, the patient is rendered insensible by chloroform, and put in the position for lithotomy, each leg being held by an assistant, a third assistant holding up the tumor with Jobert's bent speculum and pressing it under the pubes into its natural position. A piece of mucous membrane, about one inch long and three quarters of an inch broad, is dissected off longitudinally from the vagina just within the labia, the upper edge of the denuded part being on a level with the meatus urinarius. The edges on each side the vagina are drawn together by three interrupted sutures, and then, at the next stage of the operation, the mucous membrane is dissected off laterally and posteriorly, in the shape of a horse shoe, the upper edge of the shoe commencing half an inch below the lateral points of denudation, care being taken to remove all the mucous membrane up to the edge of the vagina, where the skin joins it. Two deep sutures of twine are then introduced about an inch from the

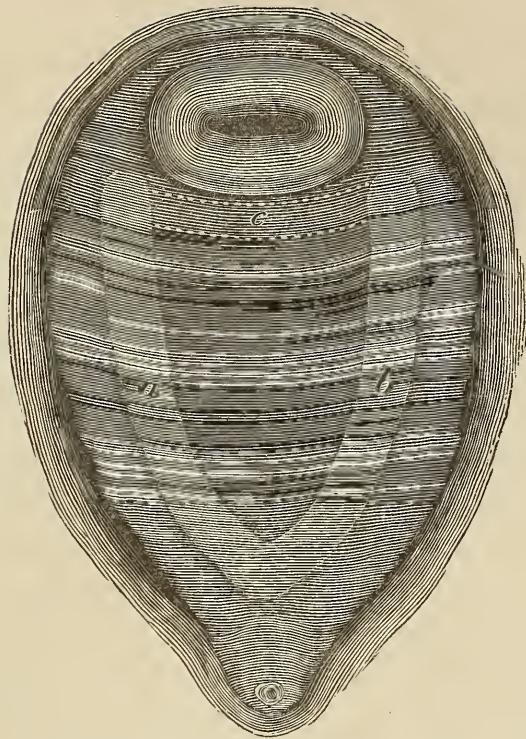
margin of the left side of the vagina, and brought out at the inner edge of the denuded surface of the same side, and again introduced at the inner edge of the denuded surface of the right side, and brought out an inch from its margin. In this way the two vascular surfaces are brought together and retained by means of quills, as in the operation for ruptured perinæum. The edges of the new perinæum are lastly united by interrupted sutures. Two grains of opium are given directly, and one grain every six hours; simple water dressing. Beef tea and wine for diet. A catheter with an elastic bag attached is kept in the bladder. Mr. Brown recounts at length nine cases of cystocele treated by this operation and cured, the subjects of the operations being able to resume their duties in from three to six weeks.

Marion Sims (*Uterine Surgery*, p. 289), speaking of *procidentia uteri*, remarks: "It is the opinion of many that the cervix uteri is the first in the order of exit, that it always comes down, to open, like a wedge, the parts through which the whole mass descends. I cannot say that this is not so at first, but I can, with the greatest confidence, say that it is not so in the great majority of cases when they become chronic. . . . To observe the order of descent in a case like this, reduce the parts to their normal relations, and let the patient force them out again, whether in the erect posture or on the back, and we shall see the anterior wall of the vagina first forced downwards against the perinæum, in the form of a cystocele;" more force being used the cervix descends, and the posterior wall of the vagina in the form of a rectocele. The treatment for these cases of uterine displacements complicated with cystocele, which Dr. Sims recommends at present, properly finds its place among the operations for the cure of prolapse of the anterior wall of the vagina. Dr. Sims, previously to the year 1856, had been in the habit of performing the perineal operation as recommended by Mr. Baker Brown. This procedure was

not found successful, and Sims, having observed that when the anterior wall of the vagina was pinched up into a longitudinal fold, there was no protrusion of the bladder nor uterus, conceived the idea of removing the redundant portion of the anterior wall of the vagina. "I seriously proposed to this lady," he writes, "to make a complete vesico-vaginal fistula, by removing at once, as it were, a large portion of the base of the bladder with the anterior wall of the vagina." "Proposing to excise the anterior wall of the vagina, I hooked it up with a tenaculum, pulled it well towards the posterior wall, and then grasped the base of the mass thus elevated with a pair of curved forceps, while with scissors I removed at once a very large portion of the anterior wall of the vagina." Luckily, Dr. Sims did not succeed in doing what he had intended. For, instead of excising the base of the bladder with the anterior wall of the vagina, he had pinched up only the hypertrophied vaginal mucous membrane in the forceps, and the bladder was uninjured. The raw surfaces were united by silver sutures, and the cure was complete.

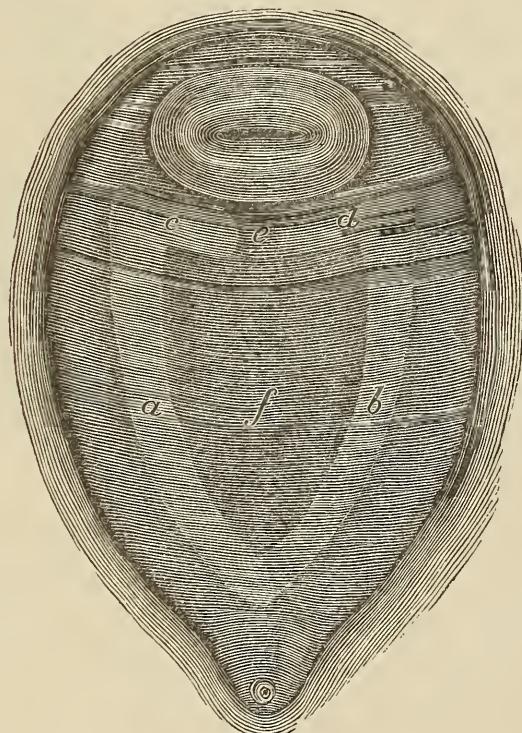
Dr. Sims continued to operate in this way for two years, and then, finding the bleeding from this large denuded surface was great, and being unsuccessful in one case, he invented another mode of operating. "Instead of the *broad* scarification of the anterior wall of the vagina, I simply removed the mucous membrane in the form of a V (See Fig. I.), the apex being near the neck of the bladder, and the two arms extending up on the sides of the cervix. These two denuded surfaces were brought together by silver sutures passed transversely, thus making a longitudinal fold, narrowing the vagina and crowding the cervix backwards" (leaving a pouch under the new septum).

Fig. I.



Marion Sims's operation for cure of prolapse of the uterus. *a* and *b*, arms of triangular flap removed; *c*, portion removed by Dr. Emmet in addition.

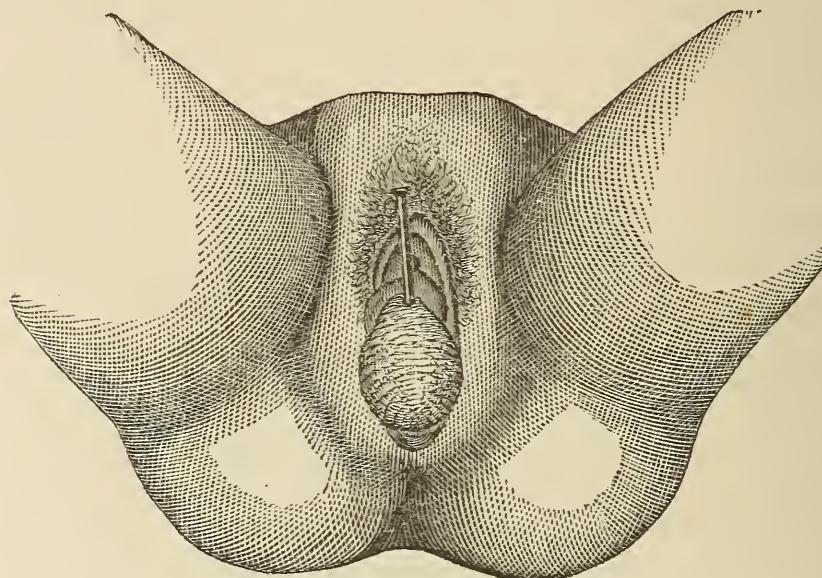
Fig. II.



Same modified and improved by the further denudation at *c e d*, practised by Dr. Marion Sims.

This operation was always successful; but in September, 1862, one of the first patients operated on by Dr. Sims came to consult Dr. Emmet, on account of persistent tenesmus, and it was found that the neck of the uterus had slipt behind the septum into the pouch, the fundus of the uterus had been thrown into the hollow of the sacrum and the organ was firmly fixed. The neck was disengaged with difficulty, and the tenesmus immediately relieved. To remedy this trouble, which Dr. Emmet found had happened in other cases, he (Dr. E.) removed the mucous membrane in a line across the "cul de sac," between the two points at the base of the triangle (Fig. II., e).

I cannot do better, perhaps, than show to the Society this representation of a case of cystocele lately under my care.



The drawing is an exact copy of the appearances, and was very kindly made for me by Mr. H. P. Quincy, late one of the House Surgeons of the Massachusetts General Hospital. The case here represented is that of Mrs. C. M., aged 42 years, married, mother of eight children, the youngest six

years old. Sixteen years since was confined with her first child; the presentation was by the foot or breech, and she was without intelligent assistance for twelve hours, during which time the labor lasted. Ever since her first confinement she has suffered with dragging pain in the back, and with difficulty of micturition; there has been a tumor protruding, much of the time, from between the external genitals, thought to be a falling of the womb; when this protrusion was large, there was dragging pain from the navel. On examination, the state of things described above, and so well figured in the accompanying sketch by Mr. Quincy, was found to exist, and the course of the urethra was found to be downwards; there was very slight prolapsus uteri, the tumor consisting of the anterior wall of the vagina, distended by the bladder.

OPERATION, April 11, 1867. The bowels having been previously emptied by a cathartic, the patient was etherized, and the bladder emptied of water by the catheter. Dr. Ropes, Dr. Lincoln and Mr. Quincy kindly assisted me. The tumor was pressed up under the arch of the pubes, and held there by a bent speculum. A piece of mucous membrane, one inch and one quarter wide and two inches long, was dissected off from each side of the vagina just within the labia, the upper line of the incisions being on a level with the meatus. On each side the raw surfaces were united by superficial interrupted sutures of twine. A horse shoe shaped piece of the same width was then dissected up from the posterior sides of the vaginal outlet, and from the fourchette. This dissection met those first made on each side, so that, in fact, the mucous membrane, just within the labia, was dissected up, for a width of about an inch and a quarter, from a point opposite the meatus on one side, round to a corresponding point on the other side. One of the assistants then seized the fundus of the bladder and drew it forcibly downwards outside the vagina. An elliptical shaped

piece of mucous membrane, two inches long by one inch wide, was dissected off the anterior face of the tumor, i. e., the roof of the vagina. The edges of this incision were united by interrupted sutures, as were also those of the previously described dissection. The perinæum, however, was not lengthened, it being thought that the amount of contraction, resulting from the cicatrices of these different raw surfaces, would be sufficient to effect the desired result. This was a mistake, as will be seen subsequently. An elastic catheter, having an India rubber tube attached, was placed in the bladder, and a wet compress and bandage applied. The operation lasted two and a half hours, and the patient was under the full effects of ether during that time. For the facility with which the operation was performed I am wholly indebted to the assistance of the gentlemen above named. Directions were given that the patient should take a grain of opium every six hours.

April 13. Catheter changed. Vagina washed out with a dilute solution of carbolic acid (a very valuable antiseptic).

April 16. Several stitches removed.

April 17. Catheter removed from bladder on account of pain and irritation. Patient to pass her water every three hours, resting on her hands and knees.

April 21. Wounds contracting finely. Tumor not protruded on coughing.

April 24. Patient allowed to stand up; tumor was not protruded on coughing.

April 25. Patient, contrary to orders, strained violently in an attempt to empty her bowels, and this morning the tumor is hanging down in the vagina.

May 2. Patient allowed to go home. Vaginal outlet is much narrowed. Tumor falls down somewhat, and will probably get larger as patient goes about. The wounds are healed. An India rubber ball was given to her, an inch and a half in diameter, and she was directed to wear this.

May 20. Patient states, "The ball has never come out, and keeps the tumor up well, except when the water accumulates in large quantities. I think if it was not for the ball, it (the tumor) would come down as much as ever."

In the treatment of cystocele we have to choose between some of the different methods above enumerated, or propose something which will answer our purpose better. The object to be attained in all methods is the same, namely, to keep the bladder so supported in its normal position that it will not become prolapsed. A recent and slight cystocele might be relieved by rest in the recumbent position, frequent catheterism and the use of astringent injections. A large and troublesome case might be treated by means of pessaries, or by operation. The choice of pessaries, or the method of operating, must be determined by the individual peculiarities of each case. A very good pessary is a roll of cotton wool; India rubber balls and inflated India rubber bags are good. When there is prolapse of the uterus (and this is a very frequent accompaniment of cystocele, and, in many cases, the cause of it) the operation either of Marion Sims, or that of Baker Brown, seems to promise the best results; and of these two operative proceedings I am inclined to give the preference to that of Dr. Marion Sims as being the most likely to give the required mechanical support. The operation of Mr. Baker Brown, thoroughly performed, would prevent the cystocele from protruding, but not always from filling the vagina.

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Massachusetts Medical Society.

SESSION OF 1867.

No. 5.

THE CONTAGIOUSNESS

OF

CHOLERA.

By HENRY G. CLARK, M. D.,
OF BOSTON.

Read before the Society, June 4, 1867.

THE CONTAGIOUSNESS OF CHOLERA.

MR. PRESIDENT AND GENTLEMEN,—I purpose to consider to-day, as well as I can in the brief space I feel at liberty to occupy, the subject of *the Contagiousness of Cholera*. It is almost unnecessary to say in this presence, that the doctrine of the contagiousness of cholera has, of late, found a very considerable number of adherents (some of them ardent and able), and that the examples, or the arguments, of these enthusiastic, but as some of us believe mistaken advocates, have been sufficiently influential to give to it such a degree of credit or currency that, to a certain extent, it may be said to have become *fashionable*. It has, at the same time, been quite distinctly announced, by some of the advocates of this novel and hurtful doctrine of contagion, that all those who, in the absence of what they deemed to be good and sufficient evidence of its truth, declined to give it their adhesion and adopt it as their profession of faith, had fallen behind the progressive and scientific spirit of the age; and that, standing as they were on the quicksands of a blind unbelief, they, and their antiquated theories, must soon be swept away by the advancing tides of a more enlightened literature.

Among these unbelievers, after having, as I think, carefully taken such observations as have enabled me to estimate “the situation,” and its difficulties and perils as well as its inherent solidity and strength, I must confess that I am, for one, quite content to stand.

I do not, of course, on this occasion, intend at all to enter upon a general discussion—for that is obviously impossible—but simply to make such suggestions as I hope may induce those who are still in *doubt* on so important a subject to examine for themselves the abundant evidence relating to it which is now accessible to the profes-

sion ; and, if possible, to induce those who have adopted a belief which very many of the best men in this and other countries, most thoroughly acquainted with cholera, believe to be an error, and founded on insufficient reasoning and unproven premises, to revise their opinions.

In order that there should be no misunderstanding in a case like the present, it is only right that the terms used should be exactly and clearly expressed. What, then, is "contagion"? It is defined by one of our best lexicographers* as "the communication of disease from one person to another by contact, direct or indirect; infection."

Dunglison says that the terms "contagion and infection are generally deemed synonymous." Such, however, I do not understand to be the generally received opinion in the profession. Contagion is best defined to be "that quality of disease by which it is capable of being communicated from one person to another by *actual contact*, or which may be caught by a *near approach*." Infection is that quality of disease by which it is capable of being transmitted, by *fomites*, or by means of clothing, rags, wool, &c., to long distances from the bodies of the sick, and which poisonous influences may be retained in them for a very considerable length of time. In *contagion*, the presence of the *person* is necessary, while in infection it is not.

Some contagious diseases, such as smallpox, are also infectious; others, such as parotitis and pertussis, are not. But infectious diseases, on the other hand, are not always contagious; yellow fever being a notable example.

The earlier advocates of the contagious properties of cholera did not hesitate honestly to use the word itself in the sense in which it is here explained, adding sometimes, also, a credence in its *infectious* qualities; but this plainness of speech, for some reason, has more recently fallen into disuse, and the more flexible words "communicable" and "communicability" are its substitutes. These were more generally applicable, and less easily brought within the well-defined limits assigned to the words "contagion," "contagiousness," "infection," &c., and may be made to convey, as might be convenient, a great variety of meanings; thus, for instance, an epidemic

* Webster, 4to, loc. cit.

which prevailed successively in various places on great routes of travel, was said to have been "*communicated*," notwithstanding the fact that it often happened that the densely populated villages radiating from infected cities, and even *intermediate cities*, frequently escaped. By some, the disease was said to be communicable through the *respiration*; by others, through the *digestive organs*, and each experimenter—for many experiments were made by injecting the veins, the air-passages, and the stomachs of dogs by fluids from patients affected with cholera—proving his own theories, and, at the same time, effectually disproving the opposite theories of his rivals.

But, in the face of the astounding fact related of "Dr. Foy and ten others, at Warsaw, who *inoculated* themselves with the blood of cholera patients, tasted their dejections, and inhaled their breath, without receiving the disease," we may safely say that the experiments of Drs. Snow and Pettenkofer only prove, what everybody knew before, that drinking of dirty water and breathing of a foul air would be the most likely means to produce cholera, in a choleraic season, in those who were thus exposed.

The most remarkable position, however, now taken with pretty general unanimity is, that in whatever mode the *materies morbi* finds its way into the body, the most efficient cause is found in the choleraic dejections themselves. On this they are agreed; but they say, when confronted with all the facts which abound everywhere, of constant and continuous exposure, and especially with such as that related of Dr. Foy, "that the dejections themselves are not poisonous until they have become by time and exposure partially decomposed"! One would imagine—if all these disagreeable conditions must be complied with in order that cholera should be communicated, and when coupled with the other aphorism (which some have promulgated) that "no new cases originate unless from some other case"—it would spontaneously die out and disappear! But such facts fade into insignificance when we consider, as well stated by a distinguished surgeon of the East India Company, "1, That the great numbers attacked *simultaneously*, and who had previously had no intercourse with the sick, cannot be accounted for except by supposing the disease to be *simply epidemic*; and, 2, The general ex-

emption from the disease of medical and other attendants on cholera cases."

In the opinion that Asiatic cholera is non-contagious we have the almost unanimous concurrence of the East India surgeons, who always see it. We have also the often deliberately expressed judgment of the General Board of Health of Great Britain. In this connection, the resolution passed by the Westminster Medical Society (a most competent body) is worth quoting. Dr. Granville moving, and Dr. James Johnson seconding the resolution, it was, after the preamble stating the time, &c., devoted to the consideration of the subject, passed in the following words:—"In the opinion of the Society, the evidence brought forward to prove the said malady to be a contagious disease has signally failed; and that *every circumstance* which has come to the knowledge of the Society shows the disease to have begun, progressed, and ended in the ordinary way of every epidemic disorder."

This opinion is confirmed and repeated by the experience of the epidemic of 1854. Dr. Sutherland, one of the Board, says:—"I look upon the evidence of the non-contagious character of cholera to be perfectly conclusive."

The physicians at Moscow and St. Petersburg generally subscribe to the same opinion. Of that of the Consulting Physicians of this city I need not speak, as it is well known.

Dr. Jacob Bigelow, for many years one of the Consulting Board, and whose opinion will, I know, have with you the great weight which should be accorded to the wisest of us all, writes as follows, and the extract contains within itself a whole volume of wisdom:—"No country, I believe, has succeeded in keeping out cholera by quarantine, and no country, as far as we know, can produce it artificially, or retain it after the predisposition has disappeared. In its own time it moves on thoroughfares where men are travelling, and spreads in cities where they are stationary, *for no better reason known than that mankind are its necessary food*, and that where there are no people there can be no cholera. But why of two frequented roads or cities it selects one and avoids the other, investigators have not yet been able to satisfy us."

In the uncontradicted statements that cases of cholera have occasionally occurred at the South all winter—in its late fatal loiterings here the last season—in the simultaneous announcements to-day of cases on the Mississippi, in London, and at Paris, we may see the foreshadowing of the pestilence, which, at these distant outposts of observation, gives us the necessary timely warning. It seems to be, then, peculiarly appropriate that we should now turn our attention to this doctrine, because a belief in the doctrine of contagion will do much towards retrograding us to the obsolete systems of quarantine.

When the members of the medical profession, as a body, and with them most heartily many non-medical sanitarians, have been making the most strenuous and energetic efforts to mitigate the costliness and hardships of quarantine, this unnecessary recurrence to the idea of contagion of course goes far to encourage the restoration of an evil we have all along been so anxiously striving to be rid of; and to prevent us from reducing it to the milder forms in which it would only be likely to exist under the requirements of modern sanitary law.

By whom has this retrograde movement been inaugurated and promoted? As in all the former history of sanitary cordons, and of rigid and useless quarantines, in times past; very much by the prejudices of non-professional functionaries—who, only taking counsel of their fears, or, perhaps, misled by their interests, have used official power ignorantly or mischievously.

Consular agents and secretaries of state, as such, know nothing of sanitary laws; and they take unwarrantable liberties in professional matters when they undertake to advise for or against quarantines.

To conclude, in the words of the distinguished East India surgeon whom I have already quoted, “It is by *both* houses conceded that if cholera is contagious, the most rigid quarantines that sagacity and experience can devise, and firmness enforce, are imperatively demanded for the protection of populations; and, that if, on the other hand, it is not contagious, such quarantines are not only useless but infinitely pernicious, by their tendency to plunge in extreme misery the hundreds of families and thousands of individuals who are de-

pendent upon the commerce they suddenly blockade, and the labor they suddenly discharge; and so to encourage those conditions which most potently invite the disease, while, at the same time, they frighten off the humaner agencies which alone can prevent, conquer, or mitigate it; therefore, we prefer to take this question sharply by the throat, and to declare our positive conclusion, deliberately reached, through careful examination and comparison of all the evidence brought forward on both sides, as well as from unusual opportunities in the very laboratories and hot-beds of this atmospheric poison, that not a single case—well attested, and clearly, completely demonstrated—of cholera transmitted by *contact alone* with the *person, clothing, excretions or effluvia of another case, has ever yet been cited*; and this we say in the full knowledge of all the *quasi ‘facts and proofs’* elaborated by the glorious minority of contagionists, whose doctrine manifestly tends, first, to make victims, and then, to leave them prostrate and unbefriended—for *panic nurses cholera*, and THE DOCTRINE OF CONTAGION PATRONIZES PANIC.”

MODERN SURGERY.

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READ JUNE 2, 1868.

MODERN SURGERY.

THE celebrated *Traité des Maladies Chirurgicâles* of Boyer was published in 1814, and the eminent author wrote at the beginning of his preface, that "Surgery appeared to have reached, or very nearly so, the highest perfection of which it seemed capable."

Fifty years and upward have elapsed since then; yet who would now dare to assert himself qualified to compose a perfect and faithful history of Surgery, to delineate with truth and impartiality the present state of that science; borrowing from all the centres whence its doctrines are diffused, in all the countries where it is successfully cultivated?

Modern surgical pathology embraces a range of study beyond any one man's comprehension. Limited but by the means and method of observation, it obliges the most studious investigation of details and expects the broadest philosophic generalization.

In reviewing the actual state of surgical knowledge, it will be found that its great advancement in our generation is due to the unlooked-for extension, in these latter years, of the sciences to which Pathology naturally turns for assistance. It is this which has given it a progressive tendency and stamped its existing condition with at least three characteristics. These are—1st, Precision of Observation; 2d, Perfection of Diagnosis; 3d, Simplification of Treatment and reluctant resort to Operation.

Precision of Observation as applied to the methodical study of surgical cases and the results of operations, constitutes almost a science in itself. Conducted or facilitated by the aid of more and more perfect instrumentalities, the perceptive faculties are distorted by fewer preconceived ideas; the mind, educated to exactness, discountenances what is merely traditional, and rejects that form of argumentation either in thinking or speaking, which takes for granted what ought to be proved.

Surgery is not an exact science. As regards no one point, therefore, can the need of examination cease, or its frequent repetition be carried too far. The observation of a single individual cannot be compared to the experience of many, and the study of current surgical literature is the only means by which this experience can be assimilated. A knowledge of disease resting on description alone is, however, of little avail, unless researches already made are confirmed afresh by renewed and reiterated investigation; by the analysis of facts in large numbers a nearer approximation to truth and better practical conclusions are made possible. It is more and more a feature of modern surgical authorship that its statements are not gathered from scattered sources, but are the fruit of individual observation. It is the aim of this observation to see phenomena as they really are; to analyze these phenomena, compare and classify them, and from these data to build a theory or reason for their existence; and so to comprehend the etiology and control the development of disease, as well as to foresee and arrest complications which the most skilled hands and ingenious devices have hitherto been powerless to prevent.

For instance, the ideas prevailing with regard to septæmic poisoning and the pathological views emanating therefrom, owe their existence to repeated observation, by methods increasing in precision, of the consequences which

follow alterations in the normal condition of the natural fluids of the body, alterations to a great extent produced by external causes, more or less amenable to control. The study of Hygiene is largely occupied with these researches. They engage the attention of surgeons of our own day more than any one subject, and have tended in a degree not sufficiently realized, to modify the aspect of modern surgery.

The practical conclusions arrived at by such observation have taught us that an injudicious diet, or mode of dressing wounds, is as pernicious in its influence on the blood or the secretions as a vitiated atmosphere; that the fear of traumatic fever need no longer proscribe animal food or alcohol to the subjects of wounds or operations; that it is for the interest of the patient as well as to the advantage of the surgeon, that dressings should be reduced to their simplest proportions. Indeed, the disuse of cerates and ointments, of fenestrated lint and charpie with its fantastic shapes, of bandaging and plasters, together with setons, issues and the lancet, has robbed minor surgery of its attractions, and simplified it almost out of date.

Between the two periods of 1836 to 1841, and of 1850 to 1861, the mortality of amputations in the Paris Hospitals diminished twenty (20) per cent.; though no single cause can be alleged in explanation, every one recognizes that the lives thus saved are a consequence of improved Hospital administration. The unequalled success of surgery in our recent war was confessedly due to the enlightened judgment which demanded the hygienic surroundings and attention to executive detail that so generally prevailed in army hospitals wherever established.

The anxiety to diminish opportunities for the entrance into the economy of poisonous emanations which distinguishes surgical treatment at the present day, has gone so far as to encourage attempts to supplant cutting instruments by the,

at least, doubtful expedients of the *écraseur* and the terrible *osteoclaste*, and by the pernicious use of caustics or other agents which exercise a coagulating influence on the organic tissues and fluids. On similar theoretical grounds, acupressure, instead of the ligature of arteries, drainage tubes to evacuate cavities containing purulent matter, and carbolic acid as a dressing competent not merely to disinfect wounds but in fact to avert inflammation, have been largely tested by experiment. Although the merit of neither of these latter methods has yet been determined, or if determined has received an unfavorable verdict, the direction of thought which these suggestions indicate attracts the attention of surgeons. The restlessness which such endeavors betray, while it disturbs conservative equanimity, is evidence of a watchful, though not always judicious activity to promote safer and surer methods of surgical treatment.

Perfection of Diagnosis, the second of the three characteristics I have mentioned, is an important aim of modern surgical inquiry.

Anæsthesia, chemistry, physics, with the microscope, optics, and electricity, experimental physiology, statistical and historical research, criticism in learned societies, have each in turn contributed to this end. The basis of all diagnosis, however, is founded upon exact anatomical knowledge, of healthy as well as morbid structures.

The habit of comparing what we observe in living patients and can see in the dead subject, has long permitted surgeons to recognize the mechanical and physical influences upon surgical disease which spring from the structural arrangement of the human body, from the relationship, density, resistance, permeability and elasticity of the tissues. Twice Velpeau diagnosed a peri-anal abscess as having its starting point at the base of the skull, between the

pharynx and the articulation of the atlas with the occipital bone. The route of urinary and purulent infiltrations may be anticipated by less skilled diagnosticians.

If the limit to which anatomical investigation by the scalpel can be carried has been reached, that attainable by the microscope is far from being approximated. Indeed, topographical anatomy, less than fifty years old, has lost its distinctive character; the requisitions of modern surgery demand, as something more than a mere accomplishment, knowledge, not of a few regions or triangles, but of the whole body even to its elemental structure; and Virchow has already shown that the fundamental elements control and modify the characteristic growth and material individualities of a tumor, in a manner not less than the constituent parts in the midst of which it is developed influence the form and contour of the whole mass.

But mere diagnosis of the existing ailment, however precise, does not satisfy the demands of an observation stimulated by existing means of exploration.

In all our clinical studies there prevails the constant effort to make out an individual and specific cause for every diagnosed disease. Though this aim is imperfectly realized, negative results, not without value, have been frequently reached.

We have learned within the last few years that pyæmia, erysipelas and malignant pustule are something more than simple inflammations. Certain paralyses and neuralgias are now known to be excited through reflex action, by lesions remote from the great nervous centres. Newly recognized and peculiar features stamp the increasing number of sequelæ which syphilis is found to occasion, as, for example, the syphilitic teeth and cornea described by Mr. Hutchinson, and the evidences of this disease in internal organs indicated by Mr. Wilks. Experimental physiology shows us that the

varying symptoms of different poisons are due to the fact that toxic influences are probably confined to a single tissue; that woorara affects the nerves of motion alone, and that crotaline affects only the blood. Chemistry points out the relations of diabetes to cataract, carbuncle and gangrene, and of albuminuria to retinitis. These are but hints of what may be expected from perfected etiological diagnosis as applied to a multitude of surgical diseases.

Rigid clinical observation and exactness in diagnosis display their beneficial influence in the Simplification of Treatment and the reluctant resort to Operation. This constitutes the third and last characteristic of modern surgery which I enumerated at the outset.

It is more and more apparent that the benign or malignant character of new growths, and consequently the propriety or impropriety of removal, is to be determined from their clinical rather than their anatomical peculiarities. Tumors, therefore, once operated on, certain glandular hypertrophies of the breast, for example, are often left to themselves in the confidence that they are self-limited affections. Others due to scrofulous or syphilitic disease are made to disappear by medical aid alone. Electrolysis, judging from what it is claimed to have accomplished, may prove an efficient agent for the destruction of certain hyperplastic growths.

An exact appreciation of the bone producing power of the periosteum has in various ways, especially in operations for necrosis and excision, enabled results to be obtained with a minimum of mutilation which but a few years ago were hardly looked for. The theoretical inferences of Ollier and the facts asserted by Sédillot, may be exaggerated, but the practical value of their researches cannot be over-estimated. Witness the results obtained in the reparation of ununited fracture by the method of Dr. Bigelow, an operation owing

its almost unfailing success to investigations characteristic of modern surgery.

The partial abandonment of the operation of Lithotomy affords an instance of the readiness with which surgeons avoid the effusion of blood. Lithotripsy was introduced just as Dupuytren was adding fresh eclat to lithotomy by his bi-lateral method, but it met with no repelling reception, and now stands as the exponent of all that is gentle, precise and bloodless in surgical manipulation.

The modern treatment of aneurism by compression or forced flexion affords another illustration. No one point of operative surgery had reached greater perfection in its details than the ligature of arteries. No operation was thought to better display the skill of the operator or excited to greater expectations the critical spectators of the amphitheatre, yet it has readily given place to a method of cure which has no witnesses but the surgeon and his patient.

The preservation of limbs is attempted where once their amputation was thought to be inevitable. *Plus je veillis, moins j'ampute*—the older I grow, the less I amputate—said Velpeau. Between 1847 and 1853, Hutin, Surgeon of the Hôpital des Invalides, had under his observation sixty-three old soldiers who had recovered from gunshot fractures of the femur, but only twenty-one who had survived amputation of the thigh. Nowhere, however, is this preservative disposition illustrated on such a scale of success as by the records of gunshot fractures of the femur, treated by our own surgeons during the late rebellion.

The treatment by compression, extension, and immobility, the substitution of dextrine or starch for cumbersome splints, have so revolutionized the treatment of diseased joints, that even excision as a substitute for amputation is decreasing in frequency of performance.

Reduction of dislocation of the hip by ether and manipula-

tion alone, instead of bleeding, tartar emetic and the pulleys, has been revived with success, only because the principles on which this simplified practice is founded have been made plain and precise by modern investigation. The anatomical points connected with this operation it is well remembered were admirably elucidated before this Society at its Annual Meeting in 1865.

The limited application of the trephine at the present day in fractures of the skull, its use being almost proscribed by French surgeons, is in great contrast to the frequent resort to its aid which prevailed within the recollection of surgeons still active. Fractures are treated almost without the aid of apparatus. Chopart's and Pirogoff's amputations, Syme's operation for stricture, the tying and cutting of varicose veins, are less and less frequently performed. The illusions and exaggerations of tenotomy and other subcutaneous sections, if not in club-foot and staphyloraphy, at least as applied to the cure of flexed fingers, of stammering and of distorted spines, are looked upon as curiosities of the past, and yet within the memory of most surgeons these very operations, from their ingenuity and originality, were deemed indications of the advancement of surgical science.

The disposition to limit the merely mechanical part of surgery is an increasing one. Though the art of performing operations is not likely to cease pre-occupying the minds of surgeons, it has evidently lost the *præminence* which characterized it at the beginning of the present century.

To dethrone the bistoury when surgeons are daily multiplying, may seem like inconsistency, but the aspirants of surgical science no longer find, by the exercise of inventive skill in the multiplication of manœuvres, the realization of their ambition. Ingenious devices are not looked upon as necessarily improvements, and still less are they deemed disco-

veries. The scrutiny which operations undergo prior to their performance does not spring from deference to a public prejudice which attributes to surgeons an over-anxiety to perform them, nor is it due to a sentimental idea that the knife should be the resource only when everything else has been tried. Surgery was never bolder than it is now, but its boldness has no affinity with constitutional coolness, or cold-blooded audacity; these constitute the traits of a surgeon who makes operative surgery the chief reliance of his system of therapeutics, and who only looks at possibility of performance before undertaking his operations.

True boldness rests on accuracy of diagnosis, which, based upon a scientific pathology, tells beforehand the organic condition of parts diseased, teaches how to favor and facilitate the processes by which nature effects her cures; whether danger may be advantageously incurred, and when neither a steady hand nor adroit manipulation can interrupt or arrest the inevitable progress of disease.

The genuine surgeon does not operate merely because there is nothing else to do, nor hesitate to declare the powerlessness of his skill, rather than compromise the good repute of his calling. In his eyes surgery is no longer a mechanical art, nor the operator an artist more or less adroit. Operative dexterity is to him but a secondary acquirement, and its possession far from marking the great difference in surgical reputations. Velpeau shone above others not by his talent as an operator, which was in no way remarkable, but by the penetration of his diagnosis and the far-seeing wisdom of his decisions.

If at one time all advancement seemed to come from across the Atlantic, it can no longer be said that the United States, New England, or even Massachusetts, are not contributing their full share of improvement in the comprehensive

studies involved in the principles of surgery, and their practical application. The present high standing of the Medical Profession in this community, largely due to the influences of your own organization, and the yearly increasing opportunities which facilitate the acquirement of a medical education, can scarcely fail to maintain that progressive professional advancement, some of the features of which I have attempted imperfectly to trace.

SOME IMPROVEMENTS IN MIDWIFERY.

BY G. W. GARLAND, M.D.
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READ JUNE 2, 1868.



SOME IMPROVEMENTS IN MIDWIFERY.

THE older members of this Society have marked with interest the advancement which has been made from time to time, during the last thirty years, in many of the departments of our profession :—in the methods of teaching, in physiology, pathology, and therapeutics, and in the treatment of many diseases ; in the improvement in surgical instruments, and operations in certain cases.

But it will be admitted, that while in these departments of medicine much of probability and surmise, much of circumlocution and complexity, has been removed, the study of Obstetrics is still overloaded with details, and the art with descriptions of operations and manœuvres some of which never need be performed. And it may not be regarded by this learned body as presuming, if I ask if this science cannot be freed from certain trammels which oppose its perfection.

However carefully authors and teachers may point out minute particulars relating to obstetrics, there are certain demonstrations needed for which language is inadequate. Theory leaves our ideas very imperfect—practical knowledge cannot be acquired from books in any department of medicine, more especially in obstetrics, where the sense of *touch* is so nearly the only guide.

By attending women in labor, the physician acquires boldness, quickness, and experience, which render him able to operate skilfully in difficult cases ; and the practitioners before me will acknowledge individually that many of the

manœuvres they adopt in the practice of obstetrics were suggested to their own minds, not from books, but by cases which occurred in their practice. And, gentlemen, the modifications in the practice of obstetrics which I am about to present to you, were first suggested to my mind by the mother of inventions, necessity.

During the first fifteen years of my practice I followed the books in "turning," using the right or left hand as the case or presentation required. My left arm having become disabled by rheumatism, and being called to *turn* in a case requiring the left hand, I made an attempt to turn with the right hand. Meeting with difficulty, it occurred to me, while my hand was in the womb, to *rotate* the child on its long axis; accordingly I spread my hand out upon the body of the child, and during the absence of pain I changed the position, and turned with ease.

For the last fifteen years, in many of the malpresentations I have been called to adjust or treat, instead of adopting the manœuvre to the presentation, I have placed the child by *rotating* in a position to improve, if need be, the presentation, and to suit my own convenience.

In so doing, I have made, in my judgment, several improvements and discoveries which may not be wholly new to you, yet were original with myself, and some of which are not referred to in any of the works which I have read.

It is a settled principle with me, that in order to easily effect version by the feet, in cases demanding that manœuvre, such as delayed malpresentations, placenta prævia, &c., the hand should be introduced into the womb *posteriorly* to the presenting part, and passed along the posterior wall of the uterus in search of the feet, and the child should be so placed by rotating, that the feet, foot, or knee can be brought down along the posterior wall of the womb, for the evident reason that the abdominal muscles yield, and offer less, much less

obstruction, than the spine of the mother, to the version of the child.

When the hand is passed posteriorly to the presenting part, whether it be the head or shoulder, it is easy to see that the part will be raised upward, and thrown forward, enough to give place for the hand, which will relieve its contact with the superior strait of the pelvis; while if the hand is passed anteriorly to the presenting part, this does not readily give place for the hand, as it is opposed by the lumbar vertebræ.

Besides this, if the hand is introduced anteriorly to the presenting part of the child, in bringing down the feet the pubic arch becomes an unavoidable fulcrum, over which the arm is compelled to act at a mechanical disadvantage, while the perinæum resists the end of the lever to which the power is applied. It will be remembered, also, that when the head of the child is posterior to the hand and arm of the operator, in the first attempt to ascend, it is thrown forward by the anterior curve of the lumbar vertebræ, in many instances absolutely preventing version when the hand and arm of the accoucheur is large, while no such inconvenience will be met when the hand and arm are posterior.

A moment's reflection will convince any one that rotating preparatory to turning is advisable in many cases of shoulder presentation.

In arm and shoulder presentations the rotation should be made backward, from right to left, or from left to right, as the case may require. When the right arm presents, if the child be rotated from right to left backward, the presenting arm must of necessity return above the superior strait of the pelvis and into the uterus. When the left hand presents, the child should be rotated from left to right backward, when the presenting part will also return.

It will be seen that my practice differs from that recommended by Dr. Simpson, not only in the *object* of rotating, but in the *manner*.

But, Fellows, great as is the advantage of rotating before turning in many arm presentations, it is of minor importance when compared with the superiority of this manœuvre in all cases where version by the vertex can be produced, and delivery effected without turning. This, in my judgment, includes all malpresentations, such as the forehead, face, chin, posterior parts of the head, neck, shoulders, back, belly, and funis.

Rotation and version by the vertex are preferable to turning in all these malpresentations of the superior parts of the child, because it is much more easily effected, with less suffering to the mother, and with greater safety to both mother and child. This is self-evident. In version by the feet, the head and breech are compelled, per force, to pass each other in the evolution, subjecting the womb to a distention at a given point, sufficient to receive two of the largest transverse diameters of the child, the head and breech; while in rotating, the womb is but little changed in its form. When the uterus by its contractions has clasped itself around the body of the foetus, we should strive to make as little change as possible in the figure and form of the child.

Version by the vertex can be accomplished after rotating in *all* malpresentations, if we except some of the deviated presentations of the pelvic extremity, as I shall soon attempt to show.

But, first, what is the best, or most favorable position of the child in utero, when labor commences? It is when the vertex lies at the mouth of the uterus, with the chin resting against the sternum, the knees flexed upon the abdomen, the tip of the shoulders on a line with the ears, with arms resting on the chest. In this position, each contraction of

the womb tends to expel the child, as an attempt to seize the slimy, tapering eel will illustrate. The harder the fish is grasped, the greater will be the force with which it escapes from the hand. In this position the child is conical, tapering like a sugar loaf toward the breech.

In all malpresentations, then, the child should be placed, if possible, in this the most favorable position, in order to secure safety to the child and a natural labor and delivery to the mother.

To explain my method of effecting changes in malpresentations is the object of my remarks. But for me to attempt at this time to refer to the various malpresentations, and to give the manœuvre for each particular case, would extend my paper to an inconvenient length—I propose, therefore, to call your attention to a few presentations and their treatment, and leave the principles with you to approve or condemn as your judgment may dictate.

Let us, then, suppose a case: the second position of the right shoulder, with protrusion of the arm. In this position the pelvis of the foetus will be toward the left, and in the upper portion of the uterus, while the head is in the right iliac fossa. Now if the mother has a roomy pelvis, and has had previous confinements, this presentation need not give anxiety to the practitioner, for the reason that version by the feet will not necessarily compromise the safety of the child.

But if it be a first confinement and the accoucheur meets with difficulty in introducing the hand into the vagina and womb—and if, after considering the diameter of the pelvis carefully, he has fears that he may find it difficult to deliver the head, *rotating* and version by the vertex should be attempted, for the reason that, if successful, this will afford greater security to the life of the child, and a natural labor to the mother. If, after rotating has been effected, the head cannot, from any cause, be rightly adjusted, the position of

the child will be so much more favorable for turning by the feet, that the manœuvre is most emphatically advised.

Before describing the manœuvre, allow me to ask you to consider, that when the hand is once in the womb, it becomes a part and parcel of its contents, and that the hand is held more or less firmly against the child by uterine action; and it is worthy of note that this uterine force is at all times just enough to obviate any necessity of grasping any part of the child to effect rotation. The concavity of the hand fits the convexity of the child's body. We see, then, that if the hand, thus placed and held, is made to traverse the internal circumference of the womb, the body of the child must follow it, while the head of the child will be rolled or turned over by the wrist or arm of the operator.

All the authors I have read, advise the use of the right hand in right shoulder presentations, and the left hand in left shoulder presentations, while I recommend the reverse when version by the vertex is the object. In the case just supposed, the right shoulder presents and the arm protrudes. In this case the *left* hand should be introduced into the vagina in the usual way and passed along the back of the arm to the shoulder, and over the shoulder till the heel of the hand, so to speak, rests upon the neck and shoulders; the hand is then to be spread out over the back of the child. During the absence of pain, the child is made to rotate backward from the *right* to the *left* of the mother and child. The right hand can be used in this presentation, by rotating the hand in the pelvis, after its introduction, so as to bring the palm of the hand against the back of the child, and rotate as described above.

Rotation having been effected, the head is to be adjusted by bringing the hand down over the head, and seizing the occiput in the palm, when the vertex can easily be brought down, and the relative position of the head and shoulders, chin and sternum accurately ascertained and secured.

The hand should then be withdrawn during or at the commencement of a pain, so that the vertex may become fixed in the superior strait of the pelvis. The case can then be left to go on as in ordinary labor, and treated as a case of primary vertex presentation. If from any cause the labor fails to go forward, the forceps, ergot, &c., can be used with more safety to the child, than what obtains in podalic version.

As you know, there are other shoulder presentations; but as I apply the same principle to each one of them, it is unnecessary to detain you by referring to them.

In all cases of presentation of the face, occiput, forehead, &c., the hand should be introduced *into* the womb to effect adjustment of the head. The reason why complete introduction of the hand into the uterus is preferable to allowing the hand to remain in the vagina and pelvis, to effect version by the vertex, as recommended by authors, is this—When the hand is introduced so as to grasp the head, the position of the shoulders is ascertained, and after rotating, and often without rotating, the head can be seized in the hand, and placed in its natural relation to the shoulders, sternum, and pelvic passage. But if we rotate the head with the hand in the pelvis, we do so at the risk of producing a kink in an already twisted neck. Besides, adjustment can be much more speedily effected, with less suffering to the mother. All, or most of us, have witnessed the tenesmus, and the reflex action produced on the uterus, diaphragm and pelvic muscles by the presence of the hand in the vagina. The pains are greatly augmented by every motion of the hand, at a moment when absence of the expulsive effort and uterine action are desirable, while little effect is produced by the arm when the hand has passed beyond the head.

Let us suppose, for the purpose of illustration, a presentation of the left side of the head, or neck, in the left occipito-iliac position; the occiput inclining to the left iliac fossa,

while the face inclines to the right iliac fossa. What is to be done in such a case?

In this presentation, as well as all others of the head, it is important that the position of the shoulders should be ascertained; accordingly, the *left* hand should be passed along the right iliac fossa, and right side of the child's neck, to the breast, and spread out upon the chest. During the absence of pain, the child should be made to rotate from left to right, forward; at the same time pressure should be made upward. As the child rolls over, it is easy to see that as the face is carried over from right to left, by the wrist of the operator, the vertex will naturally slide over the superior strait of the pelvis. Before withdrawing the hand, the vertex position can be fixed as already described.

Prolapsion of the umbilical cord is regarded by all authors and practitioners as a very serious complication of labor; not that the life of the mother is endangered, but it is extremely destructive to the child. Dr. Churchill's tables show that in 722 cases of prolapsion of the funis, 375 were lost, or more than one half. Any improvement, then, in the treatment of a prolapsed funis should, to say the least, be well received by the profession.

I beg leave to call your attention for a few moments to the effect that rotation of the child in utero will have on a prolapsed funis, wherever or whatever may be its position.

The circumference of the body of a foetus at the umbilicus, at the close of the full period of gestation, is from ten to fifteen inches, and the length of the cord is eighteen or twenty inches, sometimes more. If the child, then, be turned completely round on its axis, so as to occupy the same position it did before rotation was effected, ten to fifteen inches of the cord will be reeled on to its body, requiring that much of the prolapsed portion, provided the cord could be wound about the body directly transverse to its long axis; but as

the cord must of necessity pass obliquely or diagonally, much more of the cord will be required, and it will be found that semi-rotation will be quite sufficient, except where the cord is greatly elongated.

Prolapsion of the funis occurs more frequently in women who have borne children than in primipara, the uterine walls having, in the former, in some degree lost their tenacity. This is favorable to rotating.

In many cases prolapsus occurs in connection with neck, shoulder, back and abdominal presentations, the treatment of which by rotation effectually disposes of the funis.

In prolapsion in head presentations, however, the case is quite different, and the danger to the child much greater. It is in cases where the prolapsed funis is the only complication, that rotation is of such great importance and advantage.

What are the steps to be taken, then, when the vertex presents, with occiput to right, and face to the left of the oblique diameter of the pelvis, with pulsating cord prolapsed between the arms, over the left side of the neck, and back of the left ear of the child, with its loop in the pelvis, while the head is above the superior strait? The funis should be brought to the left of the pubic arch, and held by the right hand, while the left hand is introduced, and passed up the right iliac fossa to the shoulders, and back of the child; then the child should be made to rotate to the right or left as the pulsations of the cord or other indications demand. The rotation should be made *from* the placental end of the cord, the impulse of the foetal heart being the guide. As the cord recedes, the fingers of the right hand should follow it till it disappears above the head.

When we realize the facility with which this manœuvre causes the funis to return into the uterus, we can scarcely restrain a smile when we picture the great Ramsbotham dallying with a prolapsed funis on the end of a bit of

whale-bone; or Dr. Croft, with his hand in the womb, bearing aloft an unwelcome funis, seeking some hook or crook on which to hang it. The plan of Dr. Thomas, of New York, is entitled to consideration, if it can be resorted to before the membranes are ruptured. I have no doubt it is an effectual method, but not often available.

As the foetal heart may continue to act after its impulse ceases to be felt in the cord, it should be returned at once by rotating; unless the accoucheur is assured that the prolapsion has existed for a considerable time.

I will call your attention, gentlemen, to one more presentation requiring manual assistance.

A physician is called to the lying-in room, and is informed that the "waters broke" several hours before his visit. Contractions of the womb have commenced, and are increasing. He makes a vaginal examination, and although the os has scarcely begun to dilate, he finds a head presentation, and informs the patient and friends that "all is right" and leaves for a few hours.

On his return he learns that the pains have increased in vigor. Another examination is made, and the os found to be dilated to perhaps twice the size of a crown piece, with a puffy portion of the scalp slightly protruding at every pain. The patient is told she is getting on finely. The physician feels it will not be safe (fee safe) for him to leave again, and he concludes to remain and watch the progress of the case. Frequent examinations are made. Vigorous pains continue, the os dilates slowly, and the head remains the same as at the beginning in its relations to the superior strait.

In a few hours more, the patient becomes flushed in the face; pulse accelerated; great thirst is complained of; there is unusual heat in the vagina, and the Doctor is questioned as to the cause of this delay and suffering. Unfortunately

the medical man in attendance does not comprehend the difficulty, and the patient is told that "nature *must* have time"; that she must make the most of her pains.

Time passes. Ergot is injudiciously given. Friends get anxious; the patient's strength begins to fail. The efforts of nature are unavailing. The head at length becomes *wedged* in the superior strait. The friends and attendants are no longer to be controlled, and a consultation is demanded. The long forceps or craniotomy is the alternative; either compromising the life of the patient under the circumstances. If the mother and child are lost, the friends console themselves that all was done that could have been done.

Change the scene, and suppose she has attending her a physician who perceives, at once, the cause of the delay: who sees that nature is not able to flex the head; that at every pain the chin is forced from, instead of towards the sternum; that the head thereby has become an inclined plane, and that half the expulsive force of each pain is thrown transversely or obliquely to the perpendicular axis of the pelvis. What does he do? He simply produces flexion of the head, when the labor pains immediately become effective, and the delivery of a living joy into the arms of a fond mother is the result. Nothing is ever publicly known of the case; but, gentlemen, there is a silent consciousness of power in the breast of that physician, worth more than jewels.

How is *flexion* produced in such a case? Authors tell us to adjust the head with the hand *in the vagina*; while I recommend that the hand be *passed beyond* the head, for the reason that often one of the causes of nature's failure in this case is a twisted neck. At the moment the waters escape, the shoulders may not be on a line with the ears, and the uterus, contracting upon the body and head of the child

while thus situated, may hold them in this unnatural relation. To adjust the position, then, the body may need to be slightly rotated, and before the hand is withdrawn flexion of the head can be effected much more easily and quickly, and with less suffering to the mother, than with the hand in the vagina.

For the purpose of version by the feet, in *placenta prævia*, &c., authors tell us to introduce the hand *into* the uterus without hesitation, but caution and recaution us not to resort to such a formidable operation under any other circumstances. The reason for this, I do not understand.

Many a practitioner will throw off his coat with a flourish, and call with great assurance for a supply of oil when he finds a foetal hand in the vagina, who will sleep in an adjoining room in perfect composure while his patient suffers, for hours, untold agony, on account of some obliquity in the presentation of the head, which nature is unable to correct, because, forsooth, he has the *books* to pillow his head upon. If he cannot diagnosticate the case, he can repeat "*Meddlesome midwifery,*" "*Nature must do her own work,*" and other shields to ignorance.

It is my firm conviction, Fellows, that when introduction of the hand *into* the womb to ascertain the exact relations and position of the child in difficult cases, and when rotating to effect adjustment, shall have come into favor and general practice, podalic version will be rarely resorted to, and the forceps will be used much less frequently than at the present time.

I beg you will remember, gentlemen, that the remarks I have just made were prepared to conform to the half hour allowed me, and for the ears of practitioners, not students. Hence the want of minor details as to the *position* of the patient, the proper time for each manœuvre, the successive steps to be taken, &c. &c. I trust, however, I have pre-

sented the leading facts sufficiently clear to give you a guide to their principles, and that you may have confidence to test them in your practice, so that they may be brought out to the public by some one, in a more elaborate form, and so embellished as to find that favor with the profession at large to which they are entitled.

ENUCLEATION OF THE EYEBALL.

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READ JUNE 2, 1868.

ENUCLEATION OF THE EYEBALL.

I HAVE found among my patients a perhaps natural horror in reference to removal of the eyeball, no matter how useless this organ may have become as respects sight, and even when it has been the seat of severe or lasting pain; and I have also found my medical brethren, when bringing their patients to the specialist, shrinking from advising them to submit to the removal of a sightless globe. There seems to be a sort of vague sensation among the laity, and I have found it also among physicians, that enucleation of the eyeball is a formidable and dangerous operation, only to be resorted to in malignant disease, and as a dernier resort. The laity also do not distinguish between the comparatively trifling operation of enucleation of the globe, and the, at present, rarely necessary and more formidable one of evacuation of the contents of the orbit. I propose, therefore, to fully explain the anatomy of the operation, prove its simplicity and show its application, and thus, I trust, place before the members of the Society some of the advances of my specialty, which may not have been brought to their immediate notice.

The foundation of surgery rests, of course, on pure anatomy, and the instance before us is one of the many where anatomical points have been forgotten and only recalled when the requirements of surgery have brought them again into notice. The capsule of the eyeball, which now bears the name of Tenon, was known to the students of anatomy

hundreds of years ago. Galen knew it but imperfectly, for he says (*De usu part.*, cap. 2), "Sexta quædam tunica extrinsecus prope accedit, in duram tunicam inserta." Reald. Columbus, in his "*De re Anatomica*" (Venet. 1559, lib. 10), calls it *tunica innominata*. The first correct anatomical description; however, of this, to us ophthalmologists so important membrane, was given by Tenon,¹ before the French Institute in 1804, and the capsule is now known by his name. Hyrtl⁷ calls it *tunica vaginalis bulbi*. Richet,⁶ *aponeurosis orbiti oocularis*. Budge⁸ and Arnold make some further subdivisions of this fascia, not affecting, however, our present operation. A most careful subdivision and description is given by Henle.¹⁰ I would refer also to Linhart,³² Hélie¹³ and to Richet,¹⁴ and of course to the various recent compendiums on ophthalmology, particularly Pilz.³¹ Mr. Dalrymple,² of London, described it in 1834 as the cellular capsule of the eye. Malgaigne has the credit of first pointing out its surgical importance; he considered it an aponeurosis, and called it *albuginea*. In 1840 Mr. Lucas,⁹ of London, and in 1841 O'Ferrall,⁴ in Dublin, and Bonnet,³ of Lyons, re-described this membrane, each independently of the other, and therefore naturally individually considered themselves the discoverer. This was one of those circumstances still too often occurring, where anatomical and physiological truths are claimed as novelties, without a previous thorough search through medical literature, which would often prevent the critic from the disagreeable necessity of showing that there is in reality nothing new under the sun.

I will here give, in order, a brief account from each of these last three authorities mentioned, because their investigations were made in special reference to the pathology and treatment of affections of the eye, and lead directly to the substitution of enucleation of the globe for extirpation of the contents of the orbit.

Mr. Lucas called Tenon's capsule the *submuscular fascia*, and thus explains its demonstration:—"The eye and its appendages, with half an inch of the optic nerve, should be removed from the orbit and placed upon a plate, the cornea being downwards. The masses of fat, together with the loose cellular tissue and bloodvessels, should be carefully dissected away, and the muscles be turned forward towards their insertions, not dissected as if with a view of exposing their appearance, but merely expanded on the surface of the plate. If the neurilemma of the optic nerve be now examined, it will be found covered with a fine fascia, which can be easily raised with the forceps, and with little difficulty can be traced off the neurilemma to the sclerotic coat at the point where the nerve enters. It will now be found to cover the posterior aspect of the sclerotica, and to advance as far as the insertions of all the muscles of the eye; at these points it turns upon itself, lines the ocular surfaces of the muscles, and passes backwards along them to where they surround the optic nerve. This fascia possesses a high degree of elasticity, and forms rather a membranous sheath for the sclerotica than an expansion for the muscles; it takes the form of the eyeball, and acts the part of a membranous cup for the organ to move in, separating it from the bellies of the recti muscles, and covering the ciliary nerves as they pass onwards to pierce the sclerotica. In the dead eye, more or less fluid will be found to exist between this cup-like membrane and the eyeball, which always enables the anatomist to separate one from the other with the greatest facility."

Dr. O'Ferrall has the merit of a pathological application of the capsule. Mr. Haynes Walton¹¹ gives a print of his own dissection, and a condensed account from O'Ferrall, who says, "It is a distinct tunic of a yellowish white color and fibrous consistence, continuous in front with the posterior

margin of the tarsal cartilages, and extending backwards to the bottom or apex of the orbit, where its consistence becomes less marked; the sharp end of a probe or a director will be sufficient to separate it from the eyeball, by breaking the fine cellular tissue which connects them. Within, where the eye glides over it, the surface is smooth, the external or orbital part loose and cellular. The muscular portions of the recti muscles lie outside of this tunic, which isolates and protects the eye in the most perfect manner possible. Half an inch posterior to its anterior margin are six well defined openings, through which the tendons of the muscles pass to their insertions in the sclerotic coat, and over which they play as through a pulley."

Bonnet, in his treatise on "Section of tendon and muscles," says, "When I meet with a case favorable to the application I would thus proceed to enucleate the globe. Distending the lids with suitable instruments which I employ, I would cut the internal rectus with the same precautions as for the operation for strabismus. Then sliding the scissors along the wound I have made, between the sclerotic on one side and the subconjunctival fascia and muscles on the other, I would cut in turn all the recti muscles near their ocular insertion. We need then only divide the obliqui as near as possible to the globe, and afterwards the optic nerve. The globe will then be removed without my interfering with any vessel or nerve, and without penetrating the orbital fat." By not touching vessel or nerve, of course he means as in the old operation for extirpation of the contents of the orbit.

Stöber,⁵ of Strasbourg, first performed this operation in 1841.

Here I think it worth while to go back to Tenon's description, which, as it has been so often misquoted, I translate from his own words:—

"A little behind the tendon of each of the recti muscles around the eye, there is formed a tendinous fascia, which proceeds from the fleshy fibres of each of the recti muscles and the membranous sheath surrounding and penetrating them. These tendinous fasciæ separate from the tendinous muscles which they arise from; they are a continuation of the fleshy fibres of the muscles, and spring from the membranous sheath enveloping each of the muscles. The largest and thickest belongs to the *abductor* muscle. It springs from the external side of the muscle, and is attached to the external angle of the orbit near the lower edge of the lachrymal gland. It acts as a counter brace on the muscle, and prevents it while contracting from pressing on the eye. The fascia of the *adductor* (*rectus internus*) is shorter and not so thick as that of the *abductor* (*rectus externus*). It commences at the point of termination of the fleshy fibres, and is implanted on the inner angle of the orbit at the edge of the nasal canal. It acts also as a counter brace. The tendinous fascia of the *elevator* of the eye (*rectus superior*) forms an aponeurotic band extending from one side of the orbit to the other, to the depth of the upper lid. The tendinous fascia of the *depressor* (*rectus inferior*) is lost in the lower lid." Tenon called it, "the new tunic of the eye."

For the surgical purposes of our operation we may regard it as a membranous sac on which the globe rolls, and which is pierced by the tendons of the muscles, the cutting of which tendons in front of the capsule at their insertion into the globe will leave this membranous sac as a basis or support for an artificial eye, and the muscles being still attached to this capsule will therefore move it and the glass eye lying on it in nearly as great degree as when an artificial eye lies against a stump of the globe left by disease or surgical interference.

This so simple operation, recommended by Bonnet, is in

such contrast to the former one, really to be dreaded, of extirpating the whole contents of the orbit, muscles, nerves, fasciae, gland, &c., that it is a wonder that ophthalmic surgeons did not sooner practise it, but not more wonderful than that even to this day, perhaps, unfortunate patients are undergoing extirpation of their orbital contents, much as certain bivalves are their contents, and with not very dissimilar instruments.

I would dwell upon this, because one of the purposes of this paper, as I have said, is to prove to you how simple and little to be dreaded this present operation is, and that it has no relation with extirpation of the orbital contents, an operation only applicable to certain tumors in the orbit. The method of operating for enucleation of the globe, taught me by Prof. Arlt, in Vienna, is the following:—

Dilating the lids with a speculum and holding in one hand a pair of toothed forceps and in the other a small pair of curved scissors, the tendinous insertion of the rectus internus muscle on the globe is seized and cut through. Retaining the grasp with the forceps the conjunctiva is cut around the cornea, and the tendons of the other three recti divided at their insertion. The scissors are now passed in behind and the optic nerve severed close to the globe, which will then start forward, and we have only to cut the tendons of the two obliqui muscles to free the eye from the orbit and leave intact the capsule of Tenon with the muscles attached to it.³⁵ This operation I have done, and it is comparatively easy, when inflammation has not bound down the conjunctiva or fastened the globe to the capsule, but under anæsthetics, at least, I would advise the following:—Raise with forceps a piece of conjunctiva near the corneal edge, pass in the curved scissors and separate the conjunctiva all round the cornea. With strabismus hook lift up and cut all four recti tendons as carefully as in operating for squint. Steady the

globe with fingers and thumb, and pass a large pair of curved scissors behind it and divide the optic nerve, which releases the globe from the orbit, and then we can sever the obliqui attachments. There will be but little bleeding. A piece of ice in the orbit is all that is required, and filling the latter with sponge or charpie and applying pressure is not only absolutely useless, but apt to be painful. A glass eye may be inserted, often within a week, and always should be as soon as possible to avoid shrinking of the soft parts, which it certainly does.

Perhaps some one will here say to me, there must be something wrong about all this, for I certainly was taught and learned, that removal of the eye was a severe and dangerous operation. Moreover, I remember the first proceeding was to enlarge the palpebral aperture in order to have room to work in. My reply is, I desire only to remove the useless and now offending organ, namely, the eyeball, and would as soon think of slitting up the lids, as a dentist would of enlarging a man's mouth to extract a molar tooth.

Yet the following is from the American Edition of Erichsen's Surgery, 1866. "Extirpation of the eyeball is also occasionally called for, when in consequence of injury or disease one eye has become disorganized and the vision of the other is sympathetically affected, and can only be preserved by the removal of the globe that is already useless. The operation may be performed in the following way:—The surgeon standing in front of the patient, makes an incision through the outer commissure of the lids as far as the edge of the orbit. The eyelids are then well everted and held apart with a wire speculum. The surgeon next passes a double hook into the globe and draws it well forward; then with a curved, broad pair of scissors he divides the conjunctiva at its upper part, and then proceeds to cut

across the several muscles of the orbit, and lastly the optic nerve."

The operation of enucleation has been found so simple, so effective when needed, and so perfectly adapted to its ends, that we may well wonder at its having been neglected so many years after Bonnet proposed and Stœber performed it. What was called *sinking the eye*, namely, cutting out a piece and letting the contents of the globe escape, was formerly the operation practised where now enucleation is in place. Pathology and experience soon taught that in the operation of sinking the eye, exactly that portion of the globe was left which was most often the source of trouble, namely, some part of the ciliary region. Hence soon came from one and another the improved method of removing the anterior part of the globe up to the edge of the retina or *ora serrata*, leaving the rest to form a stump. Dr. E. Williams, of Cincinnati, especially, proposed at the Ophthalmic Congress, at Paris, 1862,¹⁵ to remove a portion of the anterior part of the eye instead of enucleation, for the purpose of having a better stump for the eye to move on. He cut *through* the ciliary body, the only part of his operation I would object to, as we must remove all of the ciliary region to avoid sympathetic trouble of the other eye, as time has since proved. This operation, when done with stitches passed behind the portion to be removed, now has Mr. Critchett's name attached to it, as he introduced it for staphylomata.¹⁶ Four or five curved needles are passed through the globe just behind the part to be cut off, and the wound brought together, an operation which might be in place in certain cases, rather than enucleation, and we must then decide between the two. The disadvantages are the long time consumed in recovery, the probable subsequent pain, great swelling during suppuration, and the possibility that even *then* enucleation of the stump must be practised, as I

have been obliged to do where I have found traumatic or artificial sinking has occurred. On the other hand, we may get good union of the sclerotic and no great pain or swelling. But the stump remains a doubtful source of irritation.

Prof. Knapp,³⁶ of Heidelberg, has quite recently proposed a modification of this operation which may prove of very great service. He passes the needles through the conjunctiva *alone*, above and below, and by drawing it together closes the sclerotic wound, thus avoiding any chance of sympathetic irritation of the other eye, which the continued presence of stitches in the sclerotic may produce.

I will at once answer the question which may arise, by saying the false eye will move nearly if not quite as well and sometimes even better, bedded on Tenon's capsule, than if resting on a stump *which it may possibly irritate*. I may say, I have seen the muscles move the capsule sufficiently to deceive at first glance, even an oculist, as to whether the eye was false or not. But the point is just here, and it must be kept steadily in mind. The capsule will move the artificial eye well enough, and the stump, if composed of any part of the cornea or ciliary region, is never safe from the danger of producing sympathetic irritation.

In the adult, when the features, the bones and soft parts have reached their fullest development, an objection to enucleation does not apply to the same extent as in the young. The objection is this, and I would dwell upon it because little if anything will be found in regard to it in the ophthalmic literature which you will meet. After enucleation of the globe by the method proposed by Bonnet, the orbital fat seems to become absorbed, allowing the muscles and Tenon's capsule to sink in more than natural, and more than when a stump or portion of the globe remains. When done in youth before the bones are perfectly formed, or perhaps even afterwards, the osseous tissue about the orbit seems also to

shrink, giving a different outline and feature to this compared with the other side of the face. The expression is peculiar, making the patient on that side look as if thinner or not in good health, to which the bright cheek and lips give the denial. This I have seen so marked, that it always arises to my mind in deciding whether to enucleate the globe or abscise the anterior portion of it, and I have in the young chosen the latter simply on these cosmetic grounds, otherwise enucleation is greatly to be preferred, removing as it does all source of irritation which has called for the operation.

That the laity may better understand the necessity, simplicity and effectiveness of enucleation, by being taught through you to no longer dread it as something terrible, to be avoided till the last, is, as I have said, the purpose of this paper. It remains, therefore, to show when and why we ophthalmologists employ it.

Enucleation may be needed simply to get rid of an enlarged or staphylomatous globe which the lid will not cover, or which we desire to remove to give place to a false eye; or, as a prophylactic operation, to subdue or prevent sympathetic inflammation in the other eye. Years ago (1802) Beer, and afterwards especially Himly in 1843, noticed and laid stress upon the fact, that continued irritation or chronic inflammation of one eye caused its fellow to sympathize. Græfe,¹⁸ Arlt,¹⁹ Bader,²⁰ Muller,²¹ and Augustine Prichard²² of Bristol, have since then given us their special studies of sympathetic irido-choroiditis, so that at present it is as recognized as dreaded by the ophthalmologist. Trouble in the sound eye does not commence, as you might suppose, in the retina or nerve or choroid, but in the uveal tract, and gradually extends back from there towards the posterior part of the globe. A patient with an injured or inflamed eye will have, in the other sound one, intolerance of light, sensation of fulness, even perhaps perceptible to the touch,

inability to use the eye, fatigue of accommodation and contraction of the range of accommodation, long before he may apply to the surgeon, who at once recognizes this insidious sympathetic irritation from the other eye. I do not propose here, however, to discuss sympathetic inflammation, except so far as regards the removal of the injured or inflamed eye, to control or avoid it.

It is rather curious that the idea of destroying an injured or inflamed eye to prevent its acting on the other, comes from veterinary surgery. This in the horse was at first done by pushing a nail into the globe or putting lime between the lids; afterwards by Wardrop, in a less cruel manner, by opening the globe. Credit is due the English for first having proposed destruction of one eye to save the other from sympathetic trouble, and formerly the same method was used as in the horse by Barton,²³ Crompton and others. Græfe destroyed the eye by passing a thread through the sclerotic and cornea, or through the ciliary body. Walton and Taylor, as Dr. E. Williams, of Cincinnati, above quoted, preferred to cut away more of the cornea, to remove if necessary an old cataract, results of exudations, foreign bodies, &c. Now it is curious to see, that notwithstanding the knowledge which then existed of Tenon's capsule, its being repeatedly brought into notice, and even enucleation within this membrane having been distinctly proposed and to a small extent practised, yet ophthalmic surgeons did not commence the employment of this method of removing an injured or inflamed eye to save its fellow, till Mr. Critchett²⁵ in 1851, probably from seeing how successful enucleation was when practised for tumors, staphylomata, &c., and how well the false eye set and moved in the cup of the capsule, proposed and carried out this operation in preference to others for sympathetic irritation, and, as Prof. Græfe said in 1857, its practicability and success were at once established.

Again, in 1860, he says, practitioners ought to understand enucleation better than they do, for they seem to have a sort of dread of it, as if dangerous to the other eye, and as though it was a severe and bloody operation. The success attending Mr. Critchett's operation of course led other English ophthalmic surgeons to follow him, and enucleation soon became so frequent in London practice as to astonish the French and German schools, and naturally excite their opposition, which was perhaps fortunate, as the whole subject of enucleation for sympathetic trouble has in consequence been now thoroughly discussed, and the results carefully weighed and considered, so that we already have some definite laws to guide our decision.

The more this operation has been used by surgeons at the great centres of ophthalmic practice and clinical study and teaching, the more strongly do they speak of its value, simplicity and necessity. A few quotations from the highest authorities in the English, French and German ophthalmic schools will here be directly in place, and probably have their due weight.

Dr. Bader,²⁶ of London, says, "The facility with which enucleation is performed, its great freedom from risk, and the adaptability of an artificial eye, ought to make us consider a disorganized eye, which is the seat of pain or annoyance, as a foreign body whose removal the sooner it is accomplished the better. If not painful at the time it is a deformity, and is liable at any time of ill health to become the seat of inflammation, and affect sympathetically the opposite organ. It is not only unwise, but incorrect to bring before the patient's imagination the idea of 'taking the eye out,' and omitting the scientific advantage of excising; medical men must soon learn to value the operation."

Mr. Jonathan Hutchinson²⁷ says, in regard to enucleation of the eyeball even during the acute stage of traumatic pan-

ophthalmitis, "Whenever I am satisfied that an injured globe is utterly lost, I always advise its excision without loss of time. By adopting this course the patient's suffering, often extreme, is at once put an end to, and I think, also, the risk of sympathetic inflammation of the other eye is avoided. I have excised globes in all stages of inflammation, and have never seen the slightest ill consequence, whilst the patients have invariably been most grateful for the complete relief afforded."

Mr. Critchett, at the Ophthalmic Congress at Heidelberg, in 1863, says:—1st. That injuries which cause sympathetic ophthalmia are those which occur in the ciliary region. 2d. The effects of such inflammations differ in important points from those dependent on the other forms of iritis. 3d. Local or constitutional remedies have as little beneficial effect on the eye as surgical interference. 4th. Operation must be suspended till all inflammation is gone by, and even then a doubtful prognosis must be given. 5th. In view, therefore, of the uncontrollable inflammation and the danger of total blindness, it may be perhaps safer, when injuries have affected the ciliary region and threaten long irritation, to enucleate the injured eye before signs of trouble appear in the other."

From the Franco-German school Wecker²⁸ says, "It is vain to attempt to substitute iridectomy or section of the optic nerve for enucleation. There is no longer any doubt of the necessity of removing an eye which is lost, as soon as it becomes dangerous to the other. The only question arising is in reference to the case itself and the time when recourse must be had to enucleation. We are forced to enucleate: 1st. Whenever one eye remaining sound, the other is the seat of intolerable pain which, not yielding to remedies, makes us fear for the sound one. 2d. In every case where a lost eye has given rise to sympathetic irido-choroiditis in the other, no matter how slight, for this is our only means

of controlling it. 3d. In every case where the eye, till now sound, has become in any degree amblyopic, its range of accommodation rapidly diminished, intolerant of light, or incapable of prolonged use; these symptoms often being the precursors of irido-choroiditis. Enucleation will be all the more urgent when careful examination cannot find for these troubles, either in the eye itself or in the general condition, other cause than this sympathetic influence in question. Under all circumstances when in doubt, it is better to operate too early than too late, for we may find enucleation useless after sympathetic irido-choroiditis is fully established."

From the various ophthalmic clinics of Germany we also have concurrent testimony. Græfe's¹⁸ and Arlt's¹⁹ results and observations I have already quoted. Pagenstecher, at Wiesbaden, found enucleation necessary from the following causes:—

- 1st. Traumatic irido-choroiditis occasioned by
 - (a) Lesion of the iris, resulting from its being nipped between the edges of the wound.
 - (b) Lesion of the choroid.
 - (c) Suppurative choroiditis, or suppuration in the vitreous.
 - (d) Presence of a foreign body in the eye.
 - (e) Lesion of the capsule of the lens.
 - (f) Choroiditis after re-clination, or depression of the lens.
- 2d. Incipient exudative irido-choroiditis and hæmorrhage from the choroid.
- 3d. Processes leading to staphyloma (choroiditis serosa).
- 4th. Extensive separation of the retina.
- 5th. Tumor developing from the choroid or sclerotic.
- 6th. Formation of bone within the choroid.

Let me here add one more testimony from Dr. Mooren's²⁰

clinical experience for eleven years with 32,000 patients in Düsseldorf. He says, "The causes of sympathetic disease, according to my observation, may be divided into three distinct groups. 1st. Direct injuries of the ciliary region. 2d. Mechanical irritation of the ciliary body, whether by the action of a foreign body (wearing an artificial eye), or by the lens turned into a foreign body by displacement, re-clination, luxation, staphyloma, etc. 3d. Every inflammation of any part of the uveal tract, when by cyclitis it has reached its culminating point." And finally, as do all other authorities, Dr. Mooren gives, "pain upon pressure in the ciliary region as the never-failing symptom which pointed to and proved danger from sympathetic disease. When this is present, the only possibility of saving the second is by enucleation of the first affected eye."

To the above I would add the testimony of my own experience in ten years of ophthalmic practice in this community. In the medical literature of this country you will find reports of successful cases of this operation, coming from the scientific ophthalmologists of our larger cities, who strive to avail themselves of the sound sense of the English, the élan of the French, or the patient industry and scientific attainments of the German surgeons in this specialty.

I trust, therefore, my efforts have succeeded in proving to you that enucleation of the eyeball from within the capsule of Tenon, is un anatomical possibility, a surgical necessity and a powerful prophylactic remedy.

NOTE. This paper having been intended for a large State Medical Society, will explain to my brother ophthalmic surgeons why no comparison is made with simple iridectomy, section of the optic nerve, or of the ciliary nerves.

THE accompanying wood cuts are from photographs of a diagram and dissection exhibited to the Society when the paper was read.

Fig. 1. The lids are slit up vertically, and the four flaps turned back. The conjunctiva dissected off and strings passed under the tendinous insertion into the sclerotic of the external, internal and inferior recti muscles, just as they would be lifted on the hook to be cut in operating for squint. A needle is passed under the tendon of the superior rectus, which is seen to pass to the capsule of Tenon, showing itself between the upper half of the globe and the upper lid, from both of which it is freed. In a single wood cut it is of course difficult to give a more definite view of a minute dissection.

Fig. 2. Represents in *diagram* a vertical section through the orbit and eyeball. The heavy dotted line shows the fibrous lining of the orbit, which at the anterior upper and lower edge passes off to the lids, and also backwards to the globe which it surrounds to the optic nerve, thus forming Tenon's capsule. A layer behind runs over the nerve to form its sheath, and in front a prolongation extends forward to the conjunctiva. The superior and inferior recti muscles are represented, and where their tendons pierce Tenon's capsule to become attached to the globe. It will thus be seen that cutting the tendons of the muscles at their insertions, and the optic nerve, releases the globe and leaves Tenon's capsule like a cup for an artificial eye to rest on and be moved by the muscles.

Fig. 1.

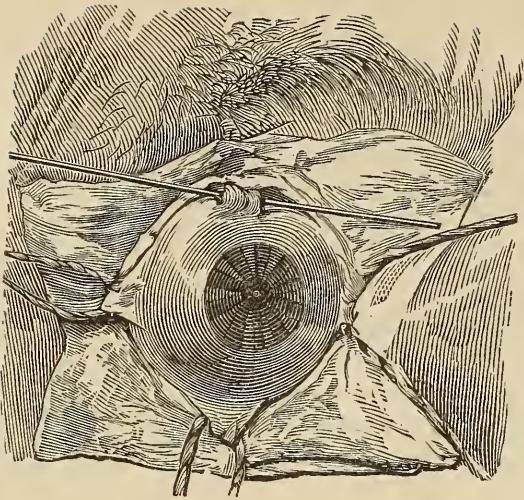
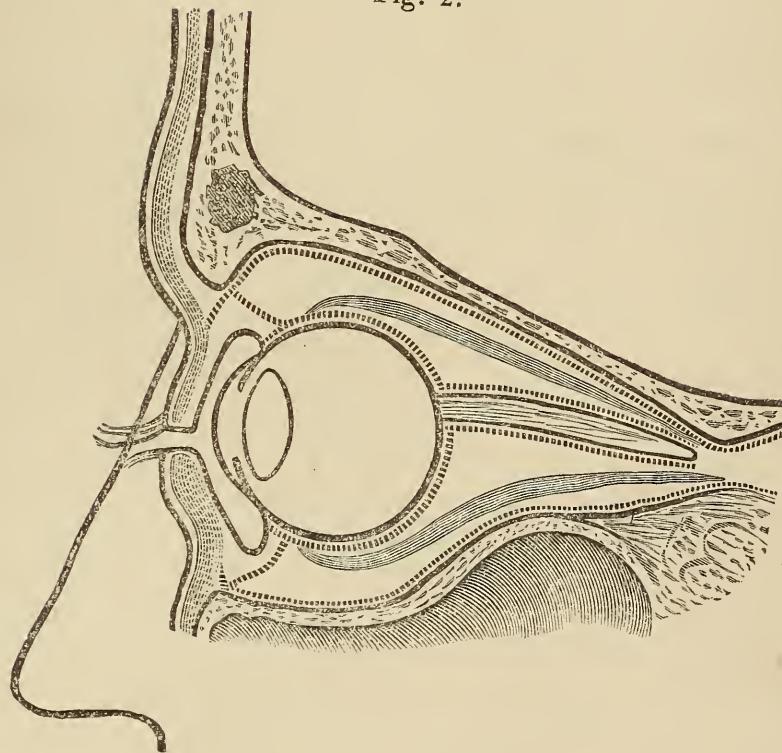


Fig. 2.



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EXTRA DIGITS.

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READ JUNE 2, 1868.

EXTRA DIGITS.

A CHILD comes into the world with two thumbs instead of one, or with an extra little finger, or, it may be, with an additional great or little toe.

The parents, if ignorant and superstitious, are dismayed; like the ancient physician, "whose pathology was mythology," they bewail the deformity as an omen of evil, past, present or future, rather than as detrimental to the elegance or usefulness of the afflicted member.

But if they are intelligent and disposed to take the matter calmly, they console themselves by recalling instances of cats and dogs, and even of innocent lambs, which had more than the usual number of digits, yet whose dispositions and those of their parents and offspring gave no sign of demoniacal influence. Some of their friends, too, have seen or heard of other children with the like peculiarity, whose parents, nevertheless, were Christians, who themselves came to no bad end, and whose descendants, even if they inherited the deformity, were in no way remarkable, or, at any rate, not objectionably so.

And so when the physician comes again, and is consulted in the matter, they are quite prepared to receive his more accurate information upon other cases, and to follow his advice with their own. If he be only a practising physician, with no other object in life than to get his patients into good condition as soon as possible, he either advises to leave the

extra digit alone, since it is not greatly in the way and may even be useful, or, if this is not the case, proceeds to remove it after the approved methods: meanwhile recounting to his hearers the like cases which have come within his knowledge; some who had seven, eight, nine and even ten fingers or toes; others, six fingers on each hand and six toes on each foot; while in other cases, these lesser peculiarities of the limbs had been associated with such extraordinary malformations of the body and head, that the astonished parents now congratulate themselves that it was no worse, and that their child was not born a Cyclops or a Hydrocephalus, instead of a simple "Sexdigitist."

But if, on the other hand, our physician is one who while exerting his utmost skill for his patient, yet allows his mind to pass from visible effects toward invisible causes, from isolated facts toward general principles, then will he take careful note of this case, will make perhaps a sketch and a dissection of the specimen, and then, as opportunity occurs, will ponder the whole subject and seek to solve the many questions which now crowd upon his mind.

What are the causes of such malformations, and how are they produced? in which of the two sexes are they more commonly found? on hands or on feet? on the right or the left side? on the ulnar or the radial, the tibial or the fibular border? and what is the occasion of the difference if any exists? All these, and many others which readily suggest themselves, now impart to such anomalies a far deeper interest than before, and if he looks upon succeeding cases with something more than a practical eye as to whether the digit shall be removed or not, and if he now makes inquiries which seem to have no reference to the physical well-being of the child or the mental anxiety of the parents, it is not, as some would have it, because science has dulled his heart to sympathy; his former feelings were merely

human; they have not now degenerated into what is less, but have rather been elevated to what is more than human.

But here, let me insist that our hypothetical Doctor, and every one who takes up this subject, shall get together as large a number of cases, and as full a history of each, as is possible, before attempting to draw from them any general conclusions. For in these days when the scientific world is flooded with theories as to the nature, the causes and the significance of the variation of organized beings; when yet the normal standards have not been determined; when there is with some a willingness to ascribe such variations to mere chance, and with others a disposition to attribute them to physical laws and condition, acting as if of themselves and independently of a Supreme Intelligence; when it is so easy to speculate, and so tedious to investigate; now, of all times, is it necessary that we restrain ourselves, and utter no theory which has not the best foundation in facts, which it is in our power to gain.

Variation is boundless and infinite. Probably no two individual things or beings are exactly alike. The cells of the bee and the webs of the geometrical spider, which have so long been held up to us as examples of mathematical exactness, are now found to differ widely among themselves. No two crystals are identical; nay, even no two symmetrical halves of crystal are identical; more marked, though too often overlooked, are the differences between the two halves of the bodies of animals and of men; males and females correspond, but are not the same; parent and child are alike, yet diverse; even species are by some supposed to vary and to change so as to lose their identity.

Merely expressing in passing my total disbelief in the truth of this last supposition, let me call attention to the individual variations of the Fingers and the Toes, a group of

cases which appeal to the medical man from nearly every stand-point of our most comprehensive profession.

For the surgeon they are a not infrequent occasion for operation. For the anatomist, their own structure and their connections with adjacent parts afford material for dissection; and the physiologist is interested in their various degrees of mobility and usefulness. The embryologist is still in doubt as to the manner of their formation and especially the means of their occasional reproduction; and the teratologist may record and consider their not infrequent association with other and more serious deformities. To the psychologist, the degree of influence which the mother's mental condition may exert upon the production of these and other physical peculiarities should be a subject of serious consideration, before the ancient and still popular opinion upon this matter is set aside as groundless. The statistician may find ample employment for his industry in recording the prevalence of extra digits in certain localities, among certain peoples, and more strikingly in certain families, where they disappear and again appear after several generations in a most remarkable manner. And finally, to each and every one of the above mentioned classes of medical men, these extra digits are too often a source of regret and disappointment; since it is rarely the case that the specimen is preserved or drawings made, or the history recorded to such an extent as to fully answer the inquiries of any two of them.

All the cases of polydactylism, a synopsis of which I shall now present, are from the human species: for though cats and dogs and other animals and birds are known to possess extra digits, their number is too small and the individual histories too incomplete for our present purpose; in addition to which, hardly any two of the common species possess the same normal number of digits.

I have also confined myself on this occasion to what is

called sexdigitism; the presence of a single supernumerary finger or toe; partly on account of the greater number of such cases and the greater ease of recording and tabulating them, but chiefly because there are high authorities who look upon every extra digit as a rudiment of a second individual; so that it is better to confine my statements to these cases, which, whatever may prove to be the correct view as to the higher numbers, are, in my own opinion, simply the result of the undue subdivision of, or an after-growth from, the primitive limb, and not in any way the indication of a double monster.*

From various sources, specimens, casts, figures, descriptions, letters, and word of mouth,† I have brought together the principal facts which could be obtained concerning one hundred and fifty-two individuals who have or have had six fingers or toes upon one or more of their extremities. The number may seem large, and it is really more than three times as great as any one has had before: but I wish before proceeding farther to express my regret that it is not one thousand, rather than one hundred and fifty-two; but as these are all which are now accessible to me, I am induced to offer them at this time, with three principal objects in view:—

1st. That I may impress upon others the value of each and every fact relating to these cases, since most of them bear directly upon questions now under discussion.

* How do the advocates of the view referred to, account for the presence of extra digits upon more than one of the limbs? do they represent portions of as many imperfect monsters? or of one and the same monster, accurately, and as a general thing, evenly, distributed upon the perfect individual? Neither hypothesis is very reasonable.

† Lest others may take the pains to record the same cases again, the writer has recorded all the cases published by Otto, *Monstrorum Sexcentorum Descriptio Anatomica*, 1841; by Simpson, in his *Obstetrical Memoirs and Contributions*, ii. p. 346; by T. Annandale, of Edinburgh, in the Prize Essay upon Malformations, Diseases and Injuries of the Fingers and Toes, 1866; by Arthur Mitchell, in a paper upon Blood Relation in Marriage, *Mem. Anthropological Society of London*, ii. 402; by Dr. Foltz, *Homologie des Membres Pelviens et Thoracique*; *Journal de*

2d. To suggest a general method of recording such cases.

3d. To indicate, so far as these cases go, the direction which we may expect will be taken by the final results of a much larger number.

The following table indicates the principal results of this record and tabulation of cases:

SEXES.	Individ- uals.	No. of Affected Limbs.	Region.		Side.		Borders.						
			Ant.	Post.	R.	L.	U.	R.	T.	Fib.	?		
Males	86	168	109	59	81	78	9	66	23	20	12	16	31
Females	39	81	56	25	41	40		20	18	18	3	8	14
Doubtful	27	40	30	10	20	17	3	24	4	2	6	3	1
	152	289	195	94	142	135	12	110	45	40	21	27	46

Ant. Anterior extremity.

U. Ulnar border.

Post. Posterior "

R. Radial "

R. Right.

T. Tibial "

L. Left.

F. Fibular "

No one, so far as I know, has hitherto offered any facts or expressed any opinion as to the comparative frequency of extra digits in the two sexes; and in some cases the sex of

Physiologie, vol. vi. p. 49, 1863; by Reaumur, L'Art de Faire Eclos Oiseaux Domest., 1751, p. 377, quoted incorrectly by Huxley, on the Origin of Species, p. 93; by Darwin, on Animals and Plants in Domestication, 1868, vol. ii.; by Dr. John Struthers, Variation in the number of Fingers and Toes and of the Phalanges, Edinburgh New Phil. Journal, July, 1863; by Dr. J. B. S. Jackson, Catalogue of Museum of Boston Society for Medical Improvement; by Vrolik, Cyclopedie of Anatomy and Physiology, iv.-ii. p. 948. He has also had access to all the specimens in the Warren Anatomical Museum of the Harvard Medical College, in Prof. Wyman's Museum in Cambridge, and in the Museum of the Boston Society for Medical Improvement; and has likewise found a large number of isolated cases in books, and by inquiring has procured reliable accounts of cases now living. Several important and interesting cases which were sent by Dr. George J. Fisher, of Sing-Sing, New York, the only one who has devoted himself especially to these malformations, and who has published a valuable treatise upon Diplo-teratology (concerning Double Monsters), were unfortunately received too late for tabulation; but these and all others which can be obtained the writer hopes, at some future time, to publish both singly and by tabulated results; the present contribution being intended only as an incentive and help to others. Probably there is scarcely a neighborhood where one or more cases may not be discovered.

the patient is not even mentioned, although it must have been known to the recorder.

It is a generally received opinion that not only is the male the more highly organized, but that he is also more liable to malformations resulting from an *excess* of development, such as double monsters, &c., while the female is thought to be more commonly subject to *arrests* of development. Now whether extra digits are always so many primary subdivisions of the rudimentary hand or foot, or whether they are subsequent outgrowths from the hand or foot already formed, they are in both cases the result of an excessive action in one form or another, and so it is interesting to find that of one hundred and fifty-two individuals affected with extra digits, eighty-six are males and only thirty-nine females: the sex of the remaining twenty-seven is not known.

The one hundred and fifty-two individuals represent six hundred and eight limbs, of which two hundred and eighty-nine or nearly one half were affected. Of these two hundred and eighty-nine affected limbs, one hundred and forty-two were on the right side and one hundred and thirty-five on the left side. The difference between the two sides is therefore very slight; it does not even appear that the two hands differ any more than the two feet, and while the preponderance of cases is upon that which is generally regarded as the dynamic side of the body, perhaps it was not to be expected that parts which vary so slightly in their normal structure and uses should present any striking differences in their malformations.

We come now to a most important and interesting division of the subject: namely, as to the relative frequency of a sixth digit upon the anterior and posterior extremities, the hands and the feet.

Here I must admit having been very decidedly predisposed towards the result which has been reached, for it was this very question which led me first to take up the subject.

While studying the various comparisons of the fore and hind limbs of man and animals which have been instituted by different anatomists, it appeared to me that far too much weight had always been attached to the structure and attitude of the fore limbs, on account of their greater *functional* importance; so that they were generally unable to see how nearly the two limbs may be made to correspond in a symmetrical or antagonistic manner, as do those of the right and left sides.

The greater functional value of the hand was not to be questioned; but it occurred to me that if it could be shown that the hand and the whole arm are more variable than the foot, in attitude, in proportion of parts and in the number of digits, then their morphological value would be diminished to a corresponding degree; and anatomists would be more ready to accept the posterior limbs as the surer guides in their comparison of the two. Now it is known to all that the more various and complicated motions are executed by the hands; also that among the different species of animals, the anterior limbs undergo the greater modification of structure and position to suit the wants of the monkey, the bear, the bird and the fish; also that when, as in the cat, the number of digits is not the same upon the two limbs, the greater number is generally on the hand.

These considerations, anatomical, physiological and zoölogical, as to the variability and consequent less morphological value of the hand, are now strikingly confirmed by the statistics of sexdigitism. For of the two hundred and eighty-nine affected limbs, one hundred and ninety-five, or more than two thirds, are hands, the remainder being feet.

Here there is a possible disturbing element; for it may be said that the extra digit would be more often removed from the feet than from the hand; indeed the additional thumb is sometimes thought by the possessor to be a decided advan-

tage, either in grasping a pen-handle or in taking anything from his vest pocket, by opposing the tips of the two thumbs.*

But I hardly think the consideration above mentioned will account for the great difference which exists between the hands and the feet in this respect. The result confirms the opinion already expressed by Struthers, which, however, was based upon a much smaller number; while it is directly opposed to the opinion of Darwin, who in his last work, on Animals and Plants under Domestication, says that he has tabulated forty-six cases and finds a slight preponderance in favor of the feet, there being seventy-five feet and only seventy-three hands; but this probably includes all varieties of polydactylism.

No less striking than the above is the comparative frequency of the extra digit on the ulnar and radial borders of the hands, the tibial and fibular borders of the feet; and as this, too, bears directly upon a part of the question as to the comparison of the fore and hind limbs, I will dwell upon it for a moment.

A distinguished French anatomist,† who has declared his belief in the existence of a true symmetrical or polar relation of the fore and hind limbs, has coupled with it a theory as to the binary composition of the thumb and great toe; the desire for this arises from his feeling that both these digits are too large for a correspondence with the little toe and little finger, opposite which they come when the hand and foot are symmetrically placed; but his only *facts* in its support

* There are also one or two families in Germany whose members pride themselves upon the possession of an extra thumb, and there is an Arab Chieftain whose ancestors have from time immemorial been distinguished by the double thumb upon the right hand. But in view of the great difficulty of eradicating the malformation from a family, one is reminded in all these cases of the fable of the fox who had lost his tail, and ever afterward recommended others to get rid of theirs.

† Dr. Foltz.

are a few cases of extra or double thumbs and great toes, which he thus conceives to represent the normal condition of the parts. But the facts we have to offer indicate that the little finger and little toe are by far the more often double or supernumerary: for of the one hundred and ninety-five hands, one hundred and ten had a supernumerary little finger, and only forty-five an additional thumb; while upon the feet there are twenty-seven extra little toes and only twenty-one great toes.

The greater difference in the relative frequency of an extra digit on the ulnar and radial side of the hand, as compared with that between the tibial and fibular borders of the feet, we may associate with the greater functional distinction between the thumb and the little finger: but the greater variability of the little toe and little finger does not appear to be in accordance with the idea already alluded to, that variation is more frequent in that sex, and in that region of the body, where the greater development and activity exists.

There is one matter which does not come strictly under the head of extra digits; but as it is a variation of a similar nature, and especially as the cases are both rare and extremely valuable, I will say a few words concerning it. There are a few instances (of which one specimen is in the museum of the Boston Society for Medical Improvement) of a thumb possessing an additional phalanx so as to be long and finger-like, yet opposable to the other digits. The chief value of such cases consists in this: that the most serious objection to symmetry, in the minds of those who still insist upon a comparison of the fore and hind limbs as parallel parts, and who consequently consider the thumb and great toe to correspond with each other, is the fact that both these digits normally consist of only two phalanges, while all the others possess three. It is my own opinion that this difficulty is a wholly superficial one, and that the difference in

the number of phalanges is simply a difference of quantity like that in the number of digits themselves, and therefore no basis for a morphological comparison;* but every such case of a thumb or a great toe having three phalanges is so much toward the means of convincing anatomists that they really correspond, not to each other, but to the little toe and little finger, respectively.

It may be interesting to know which are the more common extra digits among these cases. Of one hundred and eighty-five limbs, being all of which both the sex, side of body, limb, and border are known, the following is the order of frequency. There is a slight difference between the two sexes, but the numbers are too small to prove anything of single digits, and I give only the totals. The order of frequency is as follows:

Right little fingers,	.	.	.	.	.	53
Left little fingers,	.	.	.	.	.	52
Right little toes,	.	.	.	.	.	18
Right thumbs,	.	.	.	.	.	17
Left thumbs,	.	.	.	.	.	17
Left little toes,	.	.	.	.	.	11
Left great toes,	.	.	.	.	.	10
Right great toes,	.	.	.	.	.	7
						185

So far we have treated of extra digits according to the *separate limbs* upon which they occur, and, excepting when the sexes were mentioned, have dealt with the *individual* sex-digitists only in *quarters*, giving to each limb a distinct place in our results as well as upon the blanks. Let us now put together the limbs of each individual, and see how they were combined. To do this we must first make a division of the sexdigitists into those which had but one limb affected, those which had two, those which had three, and those which had four; these four groups being called Unisexdigitists, Bisex-

* Morphological Value and Relations of the Hand; Silliman's Am. Journ. of Science and Art, xliv. July, 1867.

digitists, Trisexdigitists, and Quadrisexdigitists. But a second subdivision, the use of which will presently be seen, may be into Unisexdigitists and Polysexdigitists: of the former there are seventy-three, and of the latter seventy-five; these being divided as follows among the three minor groups—Bisexdigitists thirty-four, Trisexdigitists eleven, Quadrisexdigitists thirty.

COMBINATION OF EXTRA DIGITS IN INDIVIDUALS.

<i>Unisexdigitists.</i>	No. of Individ.	<i>Bisexdigitists.</i>	No. of Individ.
Right thumbs	16	Both little fingers	24
Left "	11	" " toes	2
? "	14	" great "	2
	41	" thumbs	1
Left little finger	8	" " or little fingers	2
Right " "	5	" great or little toes	1
? " "	8	Right little finger and little toe	1
	21	" " " great or little toe	1
Right little toe	3		34
Left " "	2		
? " "	2		
	7		
Left great "	2	<i>Trisexdigitists.</i>	
Right " "	1	Both little fingers and right great toe	5
? " "	1	" " " " little "	2
	4	" thumbs and left great toe	1
		" great toes and left thumb	1
		" " " right "	1
		" " " " little finger	1
			11
		<i>Quadrисexdigitists.</i>	
		Both little fingers and both little toes	6
		" " " " " great "	1
		" " " " " ? "	6
		Both thumbs and both great toes	1
		" fingers or thumbs and both great or little toes	16
			30

As will be seen from the foregoing table, the preponderance of hands among the unisexdigitists is very great, being sixty-two to eleven; an exaggeration of the ratio which we found by using all the separate limbs: but in our former results the little fingers have been far more numerous than the thumbs, whereas taking the unisexdigitists alone, we have forty-one thumbs to twenty-one little fingers; from which it appears that if a person has but a single extra digit it is more than five times as likely to be on a hand as on a foot; and if on a hand, twice as likely to be a thumb as a little finger.

But how is it now with the multiple group? In fifty-four of the individuals the hands were affected, and in thirty-two the feet; the trisexdigitists and quadrisexdigitists of course having one or both of the hands or of the feet affected. But what is most remarkable is the complete reversion of the ratio of thumbs and little fingers from what it was with the unisexdigitists; for here there are forty-seven individuals in whom one or both the little fingers was double, while in only five were there extra thumbs; so that if a man has two or three or four extra digits, he is nine times as likely to have a little finger as a thumb. The number of posterior digits is too small for this calculation, but it is evident that little toes are more common than great toes.

There is another point brought out by this table; namely, that when there are two extra digits the repetition is far more likely to be lateral than longitudinal; that is, corresponding digits are doubled on opposite *sides* of the body rather than on opposite *ends*: two little fingers, or two thumbs, rather than a little finger or thumb and a great or little toe. Indeed there are but two cases of this latter kind; one being that of a right little finger and a right little toe, the other being of a right little finger and either a great or little toe. There are not yet enough cases to afford any evidence in either direction upon the question whether the great toe or the little toe corresponds to the thumb.

The number of trisexdigitists is too small for this separate calculation; but the more common combination is of the two little fingers and the right great toe. The quadrisexdigitists also are too few to afford any reliable result, but here as usual the little fingers predominate; in six cases they coexist with both little toes, and in only one case with the great toes; while in six cases they coexist with toes of which it is not known whether they are great or little.

There are many other facts concerning extra digits which must be passed over here with a brief mention. Nearly all of them possessed well-formed nails. A few were pedicellated and not at all under the control of the will: but more often the attachment was firm and the only motion was between their own phalanges which generally agreed in number with those of the adjoining digit. Sometimes there was a sixth metacarpal or metacarpal bone, and there were all possible degrees of completeness from this to a single phalanx attached to the base of the terminal phalanx of the adjoining digit. Some of the extra digits were amputated in infancy, and they seldom re-appeared, though in one case it grew for a second and a third time. This reproduction of digits, however, is more common after amputation *in utero*, when they are sometimes even developed upon the extremity of an arm severed above the wrist.

A large number of cases have been observed in some parts of Scotland where intermarriage is common; but although some infirmities seem to be the direct result of this custom, it may be that extra digits are not *caused* thereby, but only spread abroad. In one case the deformity is connected with the fact of the mother having worked next to a girl with double thumbs, before her marriage.

As may be expected, the previous extent of extra digits in the family constitutes by far the most general predisposing

causes; but there must have been some, or at least *one*, first and antogenous case. The oldest on record is that of a son of Goliath of Gath, who had six fingers on each hand and six toes on each foot; but it is hardly probable that all sex-digitists are descendants of the Philistine.

The whole great subject of hereditary transmission must be passed over with a few words: in all cases I have recorded what was known of the ancestors, the brothers and sisters and the descendants; with cross references when any of these constituted others of my cases.

Dr. Struthers, who has published by far the completest account of original cases of sexdigitism, thinks it necessary to make a primary subdivision of them into the hereditary and the non-hereditary cases; but the second class will also embrace all those of which nothing is known as to ancestry; and moreover, though it is certain that there is a very decided tendency to the perpetuation of the parents' peculiarity in the offspring, sometimes even, as in one remarkable family, gathering force as it descends through successive generations, there being one hand affected in the first generation, two hands in the second, two hands and a foot in the third, and all four limbs in the fourth, yet there are so many cases in which this seems to fail, or in which the malformation appears only after one or more generations or not in the direct line of succession, that I have thought best not to attempt any generalization, and have contented myself with recording the facts so far as they could be ascertained, mentioning not only those relatives who did, but also the number of those who did not present this malformation.

Of the total one hundred and fifty-two individuals, thirteen, or one in eleven or twelve, had some other deformity beside the extra digit: two were giants; Anna Boleyn had a supernumerary mamma and an additional upper tooth. *Hydrocephalus*, or some deformity of the head, existed in four cases;

harelip and *cleft-palate* in five; one individual was a part of or *double monster*; *varus* of one or both feet was present in four cases; and in four there was an abnormal condition of the organs of generation.

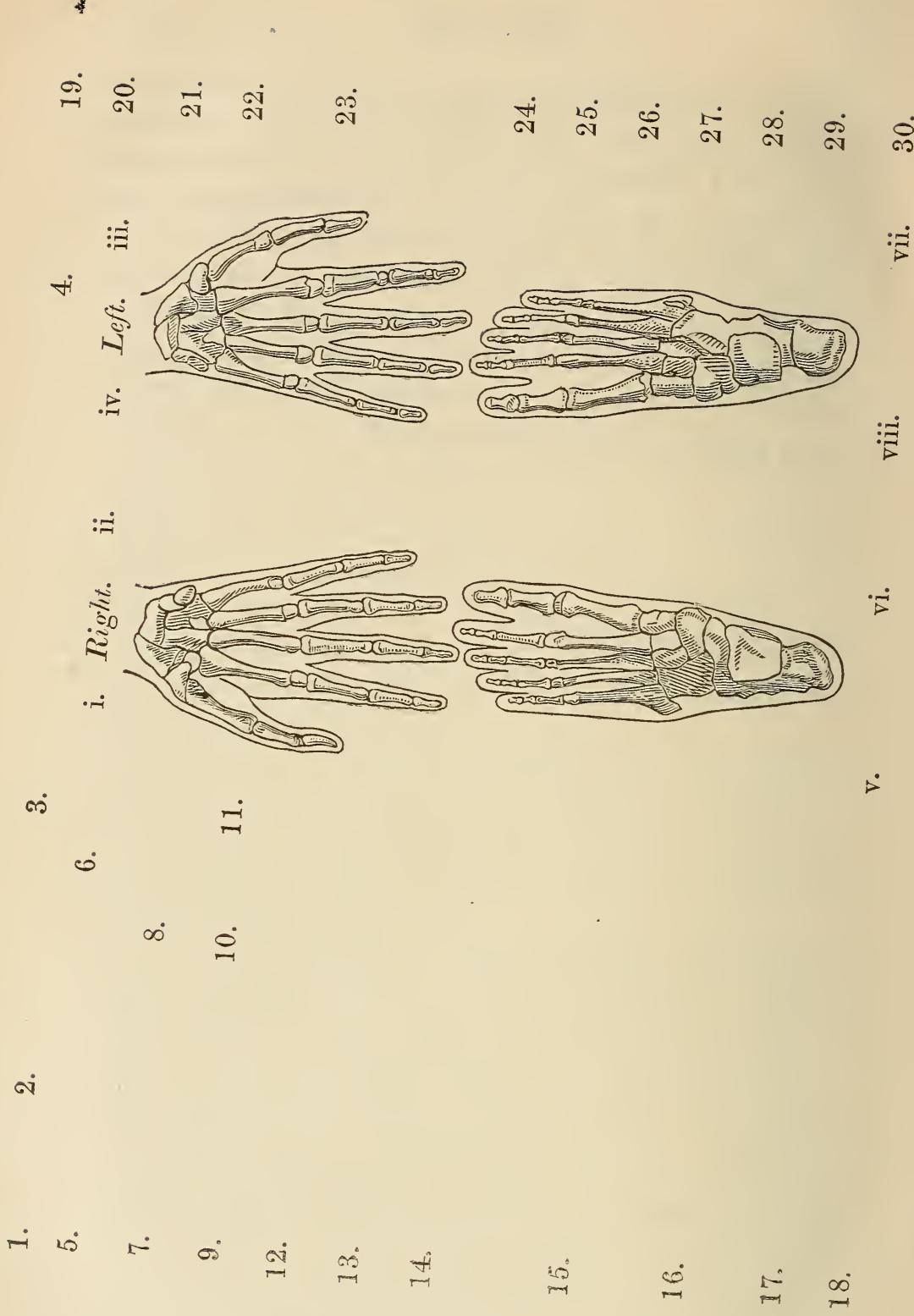
In addition to the points already mentioned, it is necessary to state the date of record, to affix the name or initials, real or fictitious, of the individual, and his residence or the museum containing the specimen or the title of the works where it is figured or described; all this to avoid the possibility of using the same case a second time.

For convenience of recording these facts I have used a half sheet blank, on which are figures corresponding to a list of questions, the answers to which are to be given; additional remarks, and a tracing or drawing of the specimen may be put upon the back. The middle of the front is occupied by a diagram of the palms and soles of the four limbs, upon which it is easy to add the extra digits, so as to show at a glance what the individual possessed.

"It is truly remarkable," writes the gifted German anatomist, Oken, "what it costs to solve any one problem in philosophical anatomy; without knowing the what, the how, and the why, one may stand, not for hours or days, but for weeks, before a fish's skull."

To know the what, the why and the how, is the aim of every seeker after truth, and that truth is only to be reached after long and patient work. The great deficiency in the matter we have considered, is the lack of material; and yet there is enough to be had; for in a single small town of New England there are three distinct families in which one or more members are sexdigitate. If I have succeeded in showing that extra digits may be viewed as something more than curiosities, or as so many pathological specimens, let me hope that no case will hereafter be allowed to go unrecorded in its most minute particular, whether of structure or function, or of history.

For if we believe that nothing happens by chance, and that male and female, right and left, anterior and posterior, internal and external, are not mere artificial distinctions of the regions of our bodies, but are truly and fully the outward embodiments of ideas and principles which have a physical, a spiritual, nay a Divine origin and significance, then the greater frequency of these anomalies in one of the two sexes, upon one or the other side of the body, upon the hand or the foot, will be a never-failing subject for thought and a stimulus to further investigation.



QUESTIONS TO BE ANSWERED IN RECORDING CASES OF EXTRA DIGITS.

To be filled out and sent to Burt G. Wilder, M.D., Cornell University, Ithaca, New York, from whom copies of this blank may be procured.

1. How many digits upon the hand or foot in question?	15. Presence of extra digits in brothers and sisters, and cousins.
2. The date when this record is made.	16. Presence of extra digits in children; giving in these three answers a reference to the individuals, and also mentioning relations which are known to be free from these malformations.
3. Name or initials of the person, or the species of the animal; if the real initials are unknown, fictitious ones may be used, taking care, of course, not to use the same ones again on the same day.	17. Predisposing causes: Heredity, Intermarriage, &c.
4. How many limbs of this individual have extra digits? *	18. Exciting causes: Mental Impressions, &c.
5. Age of individual, exact or approximate.	19. Operation for removal, when and by whom performed.
6. Sex of individual: ♂ male; ♀ female; ? unknown.	20. Result of operation.
7. Anterior or posterior extremity. Ant. or Post.	21. Name of original observer or recorder.
8. Right or left side.	22. Reference to original work.
9. Ulnar or radial border. The sign + after the answer to either of these questions indicates that there is an extra digit on the foot as well as the hand, on the left as well as the right side, &c.	23. Reference to other works in which it is mentioned.
10. Is there a nail? + or 0.	24. Race of the sexdigitist.
11. How many joints in addition to the union of the digit with the adjoining digit, or with its metacarpal or metatarsal bone?	25. Birth place of sexdigitist.
12. Degree of mobility and usefulness of the digit.	26. Present residence of sexdigitist.
13. Coexisting malformations in other parts of the body.	27. Nature of specimen.
14. Presence of extra digits in parents or grandparents, in uncles or aunts, &c.	28. Museum or collection containing it.
	29. Name of the present recorder.
	30. Residence of the present recorder.

* It is necessary to have this number in order that we may know how many blanks must be filled out in the first place, and got together afterward when we wish to study all the affected limbs of a single individual. Each of the blanks represents a limb, and it takes one, or two, or three, or four of them to give the whole individual. It is not necessary to enter all the statistics of the individual upon each blank, but only upon the first one, which should be that which gives the first of the affected limbs in the order of the Roman numerals upon the diagram ; for instance, if a man has an extra little finger on the right hand and an extra little toe on each foot, all the questions from 20 to 30 and those relating to ancestry may be answered *only* upon the little finger blank.

When, as is sometimes the case, two or more individuals are known to have similar malformations, the same blanks may answer for them all, provided a large figure be made over the left hand column, so that in all tabulation the number of individuals so represented may be known.

When it is known which are the extra digits, the Roman numerals corresponding to them are to be surrounded by a circle ; but when a description leaves us in doubt, as between two thumbs, or a thumb or a little finger, each doubtful one may be indicated by a semicircle. A drawing or tracing of the specimen or the figure may be made on the back of the blank ; and on the diagram itself the extra digits may be added in their proper places, giving simply the outline of the digit, and indicating the bones by straight lines with interruptions for the joints ; only one digit may be shown upon each blank, but it is also convenient to show them all upon the first blank.

On the back of the diagram may also be made any more extended statements or explanations regarding some of the circumstances, especially the ancestry and the supposed causes of the malformation : it is better to put all this upon the diagram, for in arranging the cases for study and tabulation only that half of the sheet need be retained.

RECOVERY

FROM THE

PASSAGE OF AN IRON BAR THROUGH THE HEAD.

BY JOHN M. HARLOW, M.D.,
OF WOBURN.

(With a Plate.)

READ JUNE 3, 1868.

RECOVERY AFTER SEVERE INJURY TO THE HEAD.

MR. PRESIDENT AND FELLOWS OF THE
MASSACHUSETTS MEDICAL SOCIETY :

I HAVE the pleasure of being able to present to you, to-day, the history and sequel of a case of severe injury of the head, followed by recovery, which, so far as I know, remains without a parallel in the annals of surgery. The case occurred nearly twenty years ago, in an obscure country town (Cavendish, Vt.), was attended and reported by an obscure country physician, and was received by the Metropolitan Doctors with several grains of caution, insomuch that many utterly refused to believe that the man had risen, until they had thrust their fingers into the hole in his head, and even then they required of the Country Doctor attested statements, from clergymen and lawyers, before they *could* or *would* believe—many eminent surgeons regarding such an occurrence as a physiological impossibility; the appearances presented by the subject being variously explained away.

It is due to science, that a case so grave, and succeeded by such remarkable results, should not be lost sight of ; that its subsequent history, termination, and pathological evidences, in detail, should have a permanent record. My desire to lay before the profession the sequel of this case, has not permitted me to remain altogether oblivious as to the whereabouts of my patient, and after tracing him in his wanderings over

the greater part of this continent, I am able to present to you indubitable evidence that my report of the case, in the Boston Medical and Surgical Journal, was no fiction. You will find the report in Vol. 39, No. 20, page 389, of the Journal; also a subsequent report, with comments, by Prof. Henry J. Bigelow, in the American Journal of the Medical Sciences for July, 1850.*

The accident occurred in Cavendish, Vt., on the line of the Rutland & Burlington Railroad, at that time being built, on the 13th of September, 1848, and was occasioned by the premature explosion of a blast, when this iron, known to blasters as a tamping iron, and which I now show you, was shot through the face and head.

The subject of it was Phin. P. Gage, a perfectly healthy, strong and active young man, twenty-five years of age, nervobilious temperament, five feet six inches in height, average weight one hundred and fifty pounds, possessing an iron will as well as an iron frame; muscular system unusually well developed—having had scarcely a day's illness from his childhood to the date of this injury. Gage was foreman of a gang of men employed in excavating rock, for the road way. The circumstances were briefly as follows:—

He was engaged in charging a hole drilled in the rock, for the purpose of blasting, sitting at the time upon a shelf of rock above the hole. His men were engaged in the pit,

* Soon after the publication of this case in the Boston Medical and Surgical Journal, in November, 1848, I received a letter from Henry J. Bigelow, Professor of Surgery in the Medical Department of Harvard University, requesting me to send Gage to Boston, generously proposing to defray his expenses and compensate him for loss of time. Gage being quite well, and the hole in the top of his head entirely closed, accepted this proposition, and remained in Boston, under the observation of Prof. Bigelow, eight or nine weeks, where he was examined by many medical men, Prof. Bigelow being thoroughly convinced, at a time when the accident had very few believers either in the medical profession or out of it, that the lesion was as represented—that the iron had traversed the cranium and brain as stated. With my concurrence he reported the case, with illustrations, in the American Journal of the Medical Sciences for July, 1850.

a few feet behind him, loading rock upon a platform car, with a derrick. The powder and fuse had been adjusted in the hole, and he was in the act of "tamping it in," as it is called, previous to pouring in the sand. While doing this, his attention was attracted by his men in the pit behind him. Averting his head and looking over his right shoulder, at the same instant dropping the iron upon the charge, it struck fire upon the rock, and the explosion followed, which projected the iron obliquely upwards, in a line of its axis, passing completely through his head, and high into the air, falling to the ground several rods behind him, where it was afterwards picked up by his men, smeared with blood and brain. The missile entered by its pointed end, the left side of the face, immediately anterior to the angle of the lower jaw, and passing obliquely upwards, and obliquely backwards, emerged in the median line, at the back part of the frontal bone, near the coronal suture. The wound thus occasioned will be demonstrated and fully described to you hereafter. The iron which thus traversed the head, is known with blasters as a "tamping iron," is round and rendered comparatively smooth by use, and is three feet seven inches in length, one and one-fourth inches in its largest diameter, and weighs thirteen and one-fourth pounds. The end which entered first is pointed, the taper being about twelve inches long, and the diameter of the point one-fourth of an inch.

The patient was thrown upon his back by the explosion, and gave a few convulsive motions of the extremities, but spoke in a few minutes. His men (with whom he was a great favorite) took him in their arms and carried him to the road, only a few rods distant, and put him into an ox cart, in which he rode, supported in a sitting posture, fully three-quarters of a mile to his hotel. He got out of the cart himself, with a little assistance from his men, and an hour

afterwards (with what I could aid him by taking hold of his left arm) walked up a long flight of stairs, and got upon the bed in the room where he was dressed. He seemed perfectly conscious, but was becoming exhausted from the hæmorrhage, which, by this time, was quite profuse, the blood pouring from the lacerated sinus in the top of his head, and also finding its way into the stomach, which ejected it as often as every fifteen or twenty minutes. He bore his sufferings with firmness, and directed my attention to the hole in his cheek, saying, "the iron entered there and passed through my head." Pulse at this time 60, soft and regular. He recognized me at once, and said "he hoped he was not much hurt." His person, and the bed on which he lay, was one gore of blood. Assisted by my friend Dr. Williams, who was first called to the patient in my absence, we proceeded to examine and dress his wounds. From the appearance of the wound in the top of the head, the fragments of bone being lifted up, the brain protruding from the opening and hanging in shreds upon the hair, it was evident that the opening in the skull was occasioned by some force acting from below, upward, having very much the shape of an inverted funnel, the edges of the scalp everted and the frontal bone extensively fractured, leaving an irregular oblong opening in the skull of two by three and one-half inches. The globe of the left eye was protruded from its orbit by one-half its diameter, and the left side of the face was more prominent than the right side. The pulsations of the brain were distinctly seen and felt.

The scalp was shaven, the coagula removed, with three small triangular pieces of the frontal bone, and in searching to ascertain if there were foreign bodies in the brain, I passed the index finger of the right hand into the opening its entire length, in the direction of the wound in the cheek, which received the left index finger in like manner, the introduction of the finger

into the brain being scarcely felt. Aside from the triangular pieces already alluded to as removed, there were two other pieces detached from the frontal bone, the anterior being two and one-half by two inches, and the posterior one and one-half by two inches in size, leaving the antero-posterior diameter of the opening in the skull fully three and one-half inches.

This examination, and the appearance of the iron which was found some rods distant smeared with blood and brain, together with the testimony of the workmen and of the patient himself, who was sufficiently conscious to say that the iron "struck his head and passed through," was considered at the time as sufficiently conclusive, not only of the nature of the accident, but the manner in which it occurred. The small pieces of bone having been taken away, a portion of the brain, an ounce or more, which protruded, was removed, the larger pieces of bone replaced, the edges of the soft parts approximated as nearly as possible, and over all a wet compress, night cap and roller. The face, hands and arms were deeply burned. The wound in the cheek was left open, the hands and arms were dressed, and the patient was left with the head elevated, and the attendants directed to keep him in that position. This was at $7\frac{1}{2}$ o'clock, P.M. At 10, P.M., same evening, the dressings are saturated with blood, but the haemorrhage is abating. Has vomited twice only, since being dressed. Mind clear. Says he "does not care to see his friends, as he shall be at work in a few days." Gives the names and residence of his relatives in Lebanon, N.H. Pulse 65. Constant agitation of his legs, being alternately retracted and extended like the shafts of a fulling mill.

At 7, A.M., the 14th, has slept some during the night; appears to be in pain; speaks with difficulty; tumefaction of face considerable, and increasing. Recognizes his mother

and uncle. Bleeding into mouth continues. Asks who is foreman in his pit. Has not vomited since midnight.

On the following day, the 15th, the haemorrhage entirely ceased. Slept well half of the night, and could see objects indistinctly with the left eye.

For a detailed and daily record of the progress of the case, I will refer you to the Boston Medical and Surgical Journal of Dec. 13, 1848. It is sufficient for my present purpose to call your attention to a brief abstract of some of the most important features of the case which followed.

On the 15th Sept., two days after the accident, the patient lost control of his mind, and became decidedly delirious, with occasional lucid intervals. On that day a metallic probe was passed into the opening in the top of the head, and down until it reached the base of the skull, without resistance or pain, the brain not being sensitive.

16th, there began an abundant foetid, sanguous discharge from the head with particles of brain intermingled, finding its way out from the opening in the top of the head, and also from the one in the base of the skull into the mouth. On the 18th, he slept well nearly all night, but was as incoherent as ever in the morning. 22d, at 8, A.M., I learn that he has had a very restless night. Throws his hands and feet about, tries to get out of bed. Head very hot. Says "he shall not live long so." 23d, I find he has rested and been quiet most of the night. Appears stronger and more rational. Pulse, which has varied from 60 to 84 since the injury, I find at 80. The scalp was reshaven and the edges of the wound brought into apposition as nearly as possible, the edges having sloughed away. The discharge less in quantity and less foetid.

At this date, ten days after the injury, vision of the left eye, though quite indistinct before, was totally lost. Up to this time it had not occurred to me that it was possible for

Gage to recover. The head had been dressed by myself three times every day; ice water kept on the head and face; the discharges carefully cleaned off, externally, while the attendants washed the mouth and fauces as often as necessary, with water and disinfecting solutions. The opening in the top of the head was always carefully covered with oiled silk underneath the wet compresses. To-day he appears stronger and more rational than before; calls for food.

Sept. 24th, 9, A.M. I find in my notes, taken at the time, that he has a pulse at 84; vision with right eye, and hearing with both ears, normal; bowels confined; can tell the day of the week and time of day; remembers persons who have visited him and incidents which have transpired since his injury. This improvement, however, was of short duration, though the discharge from the wounds had abated. I learned that in the night following he became stupid, did not speak unless aroused, and then only with difficulty; the integuments between the lower edge of the fracture in frontal bone and left nasal protuberance, swollen, hot and red, something like an erysipelatous blush. Pulse 96, soft. Failing strength. Is supported with food and stimulants. During the three succeeding days the coma deepened; the globe of the left eye became more protuberant, with fungus pushing out rapidly from the internal canthus. This fungus first made its appearance on the 19th, six days after the injury; also large fungi pushing up rapidly from the wounded brain, and coming out at the opening in the top of the head. On the 27th, the swelling upon the forehead fluctuated. The exhalations from the mouth and head horribly foetid. Pulse 84. Comatose, but will answer in monosyllables when aroused. Will not take nourishment unless strongly urged. Calls for nothing. Surface and extremities incline to be cool. Discharge from the wound scanty, its exit being interfered with by the fungi. The friends and attendants are in hourly expectancy

of his death, and have his coffin and clothes in readiness to remove his remains immediately to his native place in New Hampshire. One of the attendants implored me not to do anything more for him, as it would only prolong his sufferings—that if I would only keep away and let him alone, he would die. She said he appeared like “water on the brain.” I said it is not water, but matter that is killing the man—so with a pair of curved scissors I cut off the fungi which were sprouting out from the top of the brain and filling the opening, and made free application of caustic to them. With a scalpel I laid open the integuments, between the opening and the roots of the nose, and immediately there were discharged eight ounces of ill-conditioned pus, with blood, and excessively foetid. Tumefaction of left side of face increased. Globe of left eye very prominent.

From this date, Sept. 28th, to Oct. 6th, the discharge from the openings was very profuse and foetid. Erysipelatous blush on skin of left side of face and head. Pulse ranging from 80 to 96. Speaks only when spoken to. Swallows well, and takes considerable nourishment, with brandy and milk; says he has no pain.

Oct. 6th—twenty-three days after the injury—I find entered in my note book as follows:—General appearance somewhat improved; pulse 90, and regular; more wakeful; swelling of left side of face abating; erysipelas gone; openings discharging laudable pus profusely; calls for his pants, and desires to be helped out of bed, though when lying upon his back cannot raise his head from the pillow. By turning to one side he succeeded in rising, and sat upon the edge of the bed about four minutes. Says he feels comfortable. Appears demented, or in a state of mental hebetude.

Oct. 11th—twenty-eighth day.—Very clear in his mind; states how long he has been upon his bed, how he was injured, the particulars of the explosion, and the time in the day when it occurred.

Oct. 15th—thirty-second day.—Progressing favorably. Fungi disappearing; discharging laudable pus from openings. Takes more food, sleeps well, and says he shall soon go home. Remembers passing and past events correctly, as well before as since the injury. Intellectual manifestations feeble, being exceedingly capricious and childish, but with a will as indomitable as ever; is particularly obstinate; will not yield to restraint when it conflicts with his desires.

Oct. 20th—thirty-seventh day.—Improving; gets out of and into bed with but little assistance; eats and sleeps well. Sensorial powers improving, and mind somewhat clearer, but very childish. The fungi have disappeared. The opening in the top of the head is closing up rapidly, with a firm membranous tissue.

Nov. 8th—fifty-sixth day.—Improving in every respect. Sits up most of the time during the day. Appetite good, though he is not allowed a full diet. Pulse 65. Sleeps well, and says he has not any pain in his head. He walks down stairs, about the house and into the piazza, and I am informed that he has been in the street to-day. I leave him to-day, with strict injunctions to avoid excitement and exposure.

Nov. 15th—sixty-fourth day.—Returned last evening, and learn that Gage has been in the street every day during my absence, excepting Sunday. Is impatient of restraint, and could not be controlled by his friends. Making arrangements to go home. Yesterday he walked half a mile, purchased some articles at the store, inquired the price, and paid the money with his habitual accuracy; did not appear to be particular as to price, provided he had money to meet it. The atmosphere was cold and damp, the ground wet, and he went without an overcoat, and with thin boots; got wet feet and a chill. I find him in bed, depressed and very irritable; hot and dry skin; thirst; tongue coated; pulse

110; lancinating pain in left side of head and face; rigors, and bowels constipated. Ordered cold to the head and face, and a cathartic, to be taken and repeated if it does not operate in six hours.

Nov. 16th, A.M.—No better. Cathartic has operated freely. Pulse 120; has passed a sleepless night; skin hot and dry; pain and thirst unabated. Was bled from the arm $\frac{3}{4}$ xvi., and got: **R.** Hydrarg. chloridi, gr. x.; ipecac, gr. ii; M.

8, P.M., same day.—Pulse falling; heat and pain moderated. Took a solution of ant. pot. tart. during night, and slept well.

17th, A.M.—Much improved. Has been purged freely during night, and says he feels better every way. Has no pain in head.

18th.—Is walking about house again, free from pain in head, and appears to be in a way of recovering, if he can be controlled. Has recently had several pieces of bone pass into the fauces, which he expelled from the mouth. The discharge from the head very slight, and the opening steadily closing up.

On the 25th he was taken, in a close carriage, a distance of thirty miles, to Lebanon, N. H., his home, where I saw him the succeeding week, and found him going on well. He continued to improve steadily, until on Jan. 1, 1849, the opening in the top of his head was entirely closed, and the brain shut out from view, though every pulsation could be distinctly seen and felt. Gage passed the succeeding winter months in his own house and vicinity, improving in flesh and strength, and in the following April returned to Cavendish, bringing his "iron" with him.

He visited me at that time, and presented something like the following appearances. General appearance good; stands quite erect, with his head inclined slightly towards

the right side; his gait in walking is steady; his movements rapid, and easily executed. The left side of the face is wider than the right side, the left malar bone being more prominent than its fellow. There is a linear cicatrix near the angle of the lower jaw, an inch in length. Ptosis of the left eyelid; the globe considerably more prominent than its fellow, but not as large as when I last saw him. Can adduct and depress the globe, but cannot move it in other directions; vision lost. A linear cicatrix, length two and one-half inches, from the nasal protuberance to the anterior edge of the raised fragment of the frontal bone, is quite unsightly. Upon the top of the head, and covered with hair, is a large unequal depression and elevation—a quadrangular fragment of bone, which was entirely detached from the frontal and extending low down upon the forehead, being still raised and quite prominent. Behind this is a deep depression, two inches by one and one-half inches wide, beneath which the pulsations of the brain can be perceived. Partial paralysis of left side of face. His physical health is good, and I am inclined to say that he has recovered. Has no pain in head, but says it has a queer feeling which he is not able to describe. Applied for his situation as foreman, but is undecided whether to work or travel. His contractors, who regarded him as the most efficient and capable foreman in their employ previous to his injury, considered the change in his mind so marked that they could not give him his place again. The equilibrium or balance, so to speak, between his intellectual faculties and animal propensities, seems to have been destroyed. He is fitful, irreverent, indulging at times in the grossest profanity (which was not previously his custom), manifesting but little deference for his fellows, impatient of restraint or advice when it conflicts with his desires, at times pertinaciously obstinate, yet capricious and vacillating, devising many plans of future

operation, which are no sooner arranged than they are abandoned in turn for others appearing more feasible. A child in his intellectual capacity and manifestations, he has the animal passions of a strong man. Previous to his injury, though untrained in the schools, he possessed a well-balanced mind, and was looked upon by those who knew him as a shrewd, smart business man, very energetic and persistent in executing all his plans of operation. In this regard his mind was radically changed, so decidedly that his friends and acquaintances said he was "no longer Gage."

His mother, a most excellent lady, now seventy years of age, informs me that Phineas was accustomed to entertain his little nephews and nieces with the most fabulous recitals of his wonderful feats and hair-breadth escapes, without any foundation except in his fancy. He conceived a great fondness for pets and souvenirs, especially for children, horses and dogs—only exceeded by his attachment for his tamping iron, which was his constant companion during the remainder of his life. He took to travelling, and visited Boston, most of the larger New England towns, and New York, remaining awhile in the latter place at Barnum's, with his iron. In 1851 he engaged with Mr. Jonathan Currier, of Hanover, New Hampshire, to work in his livery stable. He remained there, without any interruption from ill health, for nearly or quite a year and a half.

In August, 1852, nearly four years after his injury, he turned his back upon New England, never to return. He engaged with a man who was going to Chili, in South America, to establish a line of coaches at Valparaiso. He remained in Chili until July, 1860, nearly eight years, in the vicinity of Valparaiso and Santiago, occupied in caring for horses, and often driving a coach heavily laden and drawn by six horses. In 1859 and '60 his health began to fail, and in the beginning of the latter year he had a long illness,

the precise nature of which, I have never been able to learn. Not recovering fully, he decided to try a change of climate, and in June, 1860, left Valparaiso for San Francisco, where his mother and sister resided. The former writes that "he arrived in San Francisco on or about July 1st, in a feeble condition, having failed very much since he left New Hampshire. He suffered much from seasickness on his passage out from Boston to Chili. Had many ill turns while in Valparaiso, especially during the last year, and suffered much from hardship and exposure."

After leaving South America, I lost all trace of him, and had well nigh abandoned all expectation of ever hearing from him again. As good fortune would have it, however, in July, 1866, I was able to learn the address of his mother, and very soon commenced a correspondence with her and her excellent son-in-law, D. D. Shattuck, Esq., a leading merchant in San Francisco. From them I learned that Gage was dead—that after he arrived in San Francisco his health improved, and being anxious to work, he engaged with a farmer at Santa Clara, but did not remain there long. In February, 1861, while sitting at dinner, he fell in a fit, and soon after had two or three fits in succession. He had no premonition of these attacks, or any subsequent ill feeling. "Had been ploughing the day before he had the first attack; got better in a few days, and continued to work in *various places*;" could not do much, *changing often*, "and always finding something which did not suit him in every place he tried." On the 18th of May, 1861, three days before his death, he left Santa Clara and went home to his mother. At 5 o'clock, A.M., on the 20th, he had a severe convulsion. The family physician was called in, and bled him. The convulsions were repeated frequently during the succeeding day and night, and he expired at 10, P.M., May 21, 1861—twelve years, six months and eight days after the date of his

injury. These convulsions were unquestionably epileptic. It is regretted that an autopsy could not have been had, so that the precise condition of the encephalon at the time of his death might have been known. In consideration of this important omission, the mother and friends, waiving the claims of personal and private affection, with a magnanimity more than praiseworthy, at my request have cheerfully placed this skull (which I now show you) in my hands, for the benefit of science.*

I desire, here, to express gratefully my obligations, and those of the Profession, to D. D. Shattuck, Esq., brother-in-law of the deceased; to Dr. Coon, Mayor of San Francisco, and to Dr. J. D. B. Stillman, for their kind coöperation in executing my plans for obtaining the head and tamping iron, and for their fidelity in personally superintending the opening of the grave and forwarding what we so much desired to see.

The missile entered, as previously stated, immediately anterior and external to the angle of the inferior maxillary bone, proceeding obliquely upwards in the line of its axis, passed under the junction of the superior maxillary and malar bones, comminuting the posterior wall of the antrum, entered the base of the skull at a point, the centre of which is one and one-fourth inches to the left of the median line, in the junction of the lesser wing of the sphenoid with the orbital process of the frontal bone—comminuting and removing the entire lesser wing, with one-half of the greater wing of the sphenoid bone—also fracturing and carrying away a large portion of the orbital process of the frontal bone, leaving an opening in the base of the cranium, after the natural efforts at repair by the deposit of new bone, of one inch in its lateral, by two inches in its antero-posterior

* The skull and iron have been deposited, by the writer, in the Museum of the Medical Department of Harvard University, in Boston.

diameters, with a line of fracture or fissure leading anteriorly through the orbital plate of the frontal bone, the anterior fossa, and deflecting laterally, towards the median line, divides the left frontal sinus, at the supra-orbital notch, and ascends the forehead along the left margin of the ridge, for the attachment of the falx major. Inferiorly the line of separation begins at the infra-orbital foramen and the malar process of the supra-maxillary from the body of the bone, terminating at a point upon the superior maxillary opposite the last molar tooth.—The bones implicated in its passage were the superior maxillary, malar, sphenoid and frontal. The iron, as you will perceive, entered the left cerebrum, at the fissure of Sylvius, possibly puncturing the cornu of the left lateral ventricle, and in its passage and exit must have produced serious lesion of the brain substance—the anterior and middle left lobes of the cerebrum—disintegrating and pulpifying it, drawing out a considerable quantity of it at the opening in the top of the head, and lacerating unquestionably the upper aspect of the falx major and the superior longitudinal sinus. As the iron emerged from the head, it comminuted the central portion of the frontal bone, leaving an irregular oblong opening in the bone of three and one-half inches in its antero-posterior, by two inches in its lateral diameter. Two of these fragments, as you will see from the specimens before you, were re-united.*

* See plates at the end of this article, showing the direction of the passage of the bar, lines of fracture in the skull, and the comparative size of the iron and head.

Remarks.

I. No attempt will be made by me to cite analogous cases, as after ransacking the literature of surgery in quest of such, I learn that all, or nearly all soon came to a fatal result. Hence I conclude to leave that task to those who have more taste for it. This case is chiefly interesting to me, as serving to show the wonderful resources of the system in enduring the shock and in overcoming the effects of so frightful a lesion, and as a beautiful display of the recuperative powers of nature. It has been said, and perhaps justly, that "the leading feature of this case is its improbability." (BIGELOW.) This may be so, but I trust, after what has been shown you to-day, that the most skeptical among you have been convinced of its actual occurrence—that it was no "Yankee invention," as a distinguished Professor of Surgery in a distant city was pleased to call it. Moreover, it would seem, when we take into account all the *favoring circumstances*, that we may not only regard partial recovery as possible, but exceedingly probable. These I will name briefly.

1st. The subject was the man for the case. His physique, will, and capacity of endurance, could scarcely be excelled.

2d. The shape of the missile—being pointed, round and comparatively smooth, not leaving behind it prolonged concussion or compression.

3d. The point of entrance outside of the superior maxillary bone—the bolt did little injury until it reached the floor of the cranium, when, at the same time that it did irreparable mischief, it opened up its way of escape, as without this opening in the base of the skull, for drainage, recovery would have been impossible.

4th. The portion of the brain traversed, was, for several reasons, the best fitted of any part of the cerebral substance to sustain the injury.

II. This case has been cited as one of complete recovery, it being often said that a very considerable portion of the left cerebrum was lost, without any impairment to the intellect. I think you have been shown that the subsequent history and progress of the case only warrant us in saying that, physically, the recovery was quite complete during the four years immediately succeeding the injury, but we learn from the sequel that ultimately the patient probably succumbed to progressive disease of the brain. Mentally the recovery certainly was only partial, his intellectual faculties being decidedly impaired, but not totally lost; nothing like dementia, but they were enfeebled in their manifestations, his mental operations being perfect in kind, but not in degree or quantity. This may perhaps be satisfactorily accounted for in the fact that while the anterior and a part of the middle lobes of the left cerebrum must have been destroyed as to function, its functions suspended, its fellow was left intact, and conducted its operations singly and feebly.

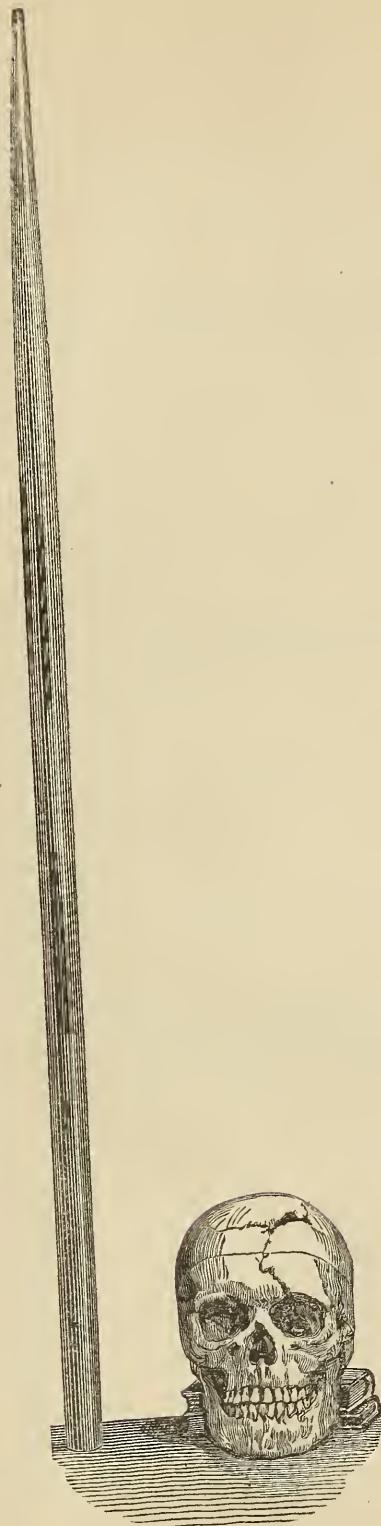
III. Little has been said in the foregoing account as to the treatment or conduct of this case, this being regarded as quite unnecessary. The initiatory treatment, received from the iron, though it might not be well received in this presence, you will permit me to say, was decidedly antiphlogistic, a very large amount of blood having been lost. May we not infer that this prepared the system for the trying ordeal through which it was about to pass? The recovery is attributed chiefly to the *vis vitæ, vis conservatrix*, or, if you like it better, to the *vis medicatrix naturæ*, of which this case is a striking exemplification.

I desire to call your attention, in passing, to two critical periods in the progress of the case, when what was done undoubtedly changed the tendency to a fatal result. The first was on the fourteenth day, when the large abscess, which probably communicated with the left lateral ventricle,

was opened, followed by a marked improvement in all the symptoms. The second was on the sixty-fourth day, at which time he was bled sixteen ounces.

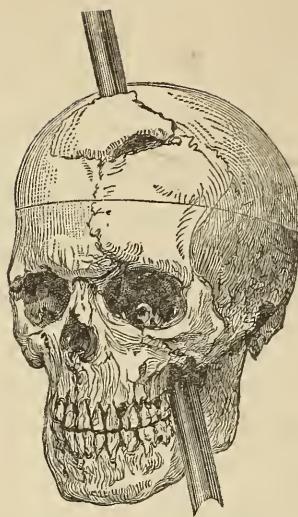
I indulge the hope, that surely but *little* if anything was done to retard the progress of the case, or to interfere with the natural recuperative powers. Nature is certainly greater than art. Some one has wisely said, that vain is learning without wit. So may we say, vain is art without nature. For what surgeon, the most skilful, with all the blandishments of his art, has the world ever known, who could presume to take one of his fellows who has had so formidable a missile hurled through his brain, with a crash, and bring him, without the aid of this *vis conservatrix*, so that, on the fifty-sixth day thereafter, he would have been walking in the streets again ? I can only say, in conclusion, with good old Ambrose Paré, I dressed him, God healed him.

Fig. 1.



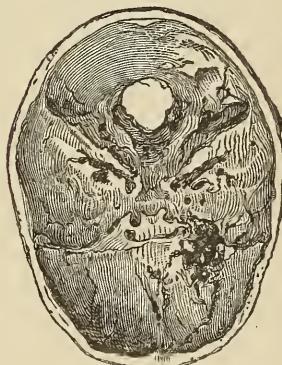
View of the tamping iron,
and front view of the cranium,
showing their *comparative* size.

Fig. 2.



Front and lateral view of the cranium, representing the direction in which the iron traversed its cavity; the present appearance of the line of fracture, and also the large anterior fragment of the frontal bone, which was entirely detached, replaced, and partially re-united.

Fig. 3.



View of the base of the skull from within; the orifice caused by the passage of the iron having been partially closed by the deposit of new bone.



CASE OF EPILEPSY.

WITH

PATHOLOGICAL INVESTIGATIONS.

By M. GONZALEZ ECHEVERRIA, M.D.,

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READ JUNE 3, 1868.

CASE OF EPILEPSY.

THERE are phenomena connected with the history of nervous diseases which, if studied and precisely defined, may prove of great avail, not only in directing us towards the means for the removal of their hurtful elements, but in elucidating many other obscure questions regarding the physiology and pathology of the nervous system. The experimental researches undertaken to obtain the needful information not unfrequently contradict each other, or disagree with the results of pathological anatomy. Therefore, comparative examination between the symptoms and the structural changes should be instituted as the surest way of getting a positive knowledge of the subject, and on this account the following case is reported:—

Hattie K. W., aged twelve, born in Wopaca, Wisconsin, entered the Mahopac Medical Institution, April 7th, 1868. She was a slender, pale girl, not much developed for her age. A brother of her maternal grandmother became insane, upon injury to the head (?), and her father died of unknown disease causing extreme emaciation. She had the first convulsions when six months old, while nursing and teething; the spasms were the sequelæ of dysentery, which attended with fever had previously affected the mother. Convulsions were a symptom thereafter present each time that the child was sick from any cause whatever, became more and more frequent, and, three years ago, assumed an epileptic character without any appreciable cause—unless it

be the change of climate from Wisconsin to Pennsylvania, where her family resides. Has had measles and other diseases of childhood, every one attended with paroxysms of convulsions when they reached their height. When about five years old she had scrofulous enlargement, without suppuration, of the lymphatic glands of the neck. In the beginning the attacks were limited to loss of consciousness, occurring two or three times a day, then ceasing for several weeks, and happening generally at night; latterly not as much so as in the early part of the winter, during which season she appears always worse. At first the convulsions seized her suddenly, now she feels sick at their approach, "with something coming up her throat"—frequently asks, "what shall I do?"—and almost always screams after turning very pale, and falls immediately backwards. The heart beats also violently and the pupils are largely dilated before the attack, during which she froths very little at the mouth, bites the tongue and lips, and is a great deal convulsed. A year ago urine was passed for a few times during the attacks; this does not now take place, nor does she wet her bed at night. Occasionally she is irritable before the fits, and when they repeat, she becomes very wild and bites and scratches herself or the persons near her. She cannot stand or walk after the attacks, and staggers on taking her first steps. Between the fits she feels as though she were to be taken sick, gets nervous, with palpitations of the heart, and suddenly runs away from the house without listening to any calling. Once she went a mile before being caught, on another occasion she escaped through the window of the room where she was. Speech is thick after the fits; there has never been any dysphagia, nor impairment of sight or hearing, nor unequal dilatation of the pupils; when not drowsy she talks wildly after the attacks, and sleeps seldom over half an hour, but always does it between successive paroxysms.

In the intervening period between the fits she bites and scratches herself, as already noticed, without consciousness of what she is doing, but otherwise she is so sensitive, that the least motion or touching of the limbs causes her great pain. The temperature is lower in the right than in the left side of the body; she perspires freely, and chiefly on the right side. Formerly she had a ravenous appetite after the attacks, but now she goes without eating anything. The breast has been enlarging for more than a year, and there has been more or less pain in the loins and back. Her other sisters menstruated at about twelve.

When she arrived at the Institution she was in a very excitable condition, having had eight attacks during the journey to this place. She had a pale sickly color, her hands exhibiting large eschars of injuries she had inflicted upon herself during the fits. The temperature in the right limbs and side of the face and neck was nearly one degree lower than on the other side (82°). Hands and feet were cold and purple. Pupils rather dilated, but of equal size. Tongue coated at the centre; breath with a strong, offensive odor. She was very sensitive to touch; she could walk and run, carrying herself with the trunk bent forward. Careful inquiry made did not detect paralysis of any kind. The girl was very talkative, prompt to reply, and her mother, who gave the above information, stated that her memory was very good, although in other respects the mind was decidedly impaired and her temper soured. The urine of the night examined the next day after she arrived, was acid, of light color, density 1021, without albumen or sugar, and loaded with triple phosphates. Pulse irregular, very weak, and ranging from 90 to 96. She was free from headache, and her bowels had not acted in some days.

Exclusive of some homœopathic treatment, the girl had never had anything done to her, and for three years past had

manifested no change excepting in the summer of 1866, when she was for seven months free from paroxysms.

She was ordered: Potass. bromidi, gr. xxx.; ammon. bromidi, gr. x.; decoct. calumbæ, f. 3 ss.; misce; to be taken three times daily. In addition: Ext. bellad. gr. $\frac{1}{6}$; ergotine, gr. ij.; misce; ft. pill. to be used night and morning. She was to be packed every morning in the wet sheet, to have a very short shower bath towards evening, to exercise in light gymnastics, and to be put under a nutritious diet with beef, cream, claret, coffee; &c. She was also kneaded and rubbed every night and morning.

The first night she had several fits, and another paroxysm the next morning after breakfast; she became irritable, and evading the vigilance of the nurse run away from the room where she was; the attacks repeated themselves through the night, and eight times again the following night. The dose of bromide of potassium was then carried up to forty grains every four hours. The convulsions ceased entirely from that time, but she continued complaining and crying whenever she was touched. The appetite failed more and more, until she would not eat anything; the breath turned excessively offensive, and a thick, white discharge ran from the mouth; this discharge existed before the bromide was used, though not so profusely, and diminished very much with a solution of permanganate of potash used as a wash. The appetite, however, did not improve; she would not swallow any solid food, and on one occasion the small parcels of beef, given to her the day before, came away the next morning upon washing out the mouth. She could not walk without staggering, or losing the equilibrium, and would scream if she were touched on any part of the body. If left alone she would bend down, to lie upon the floor. The mind, notwithstanding, continued unimpaired. Stimulants and nourishment by the mouth and rectum failing to invigorate her, or

to remove this condition, she died May 10th. The bromide was discontinued three weeks before her death; the girl became comatose about twenty hours before expiring, and even until the beginning of this stage she would utter a cry as soon as touched in any part of the body. The pupils, naturally dilated, remained to the last responsive to light. The extremities were very cold and livid, upon the feet the epidermis was in some places raised by limpid serosity, forming large phlyctæna. The bowels did not act without injections, but there was no retention of urine. Finally, I may state that the case was diagnosticated as one of epilepsy connected with lesion of the cerebellum—probably a tumor.

I obtained permission to examine the brain, and aided by Dr. W. Royster, Assistant Physician to the Institution, the skull was opened fifty hours after death, the body having been kept in ice. The calvaria was so thin that in the upper part the diploe had entirely disappeared, making the bone quite transparent; the inner table easily separated from the dura mater, which was very congested. No adhesions between the membranes and the brain; the former gorged with dark blood, and distended by a limpid serosity filling the sulci between the convolutions. Brain tissue very moist, firm and highly congested, its cut-surface exhibiting throughout a sandy appearance. The same congestion was found in the cerebellum, but the left hemisphere had undergone a degeneration involving the corpus dentatum, and giving to the tissue a lardaceous resistance when cut through. The degeneration was in the main bloodless, irregular in outline, of a yellow-whitish tint, and limited to the cerebellum without extending into the neighboring regions.

The oblong medulla with portion of the spinal cord to the level of the second cervical nerves, and also a small fragment of the cerebellum, were saved for further microscopical examination. I did not detect any membrane en-

cysting the lesion in the cerebellum, which had the microscopical characteristics of the cholesteatoma. It was composed of oval scales and rectangular tables of cholesterol, mixed with granular amorphous matter, interwoven with fibriles and nuclei of connective tissue. The capillaries around this texture were varicose and finely granular throughout. I did not discover any granular corpuscles in this part, but fatty globules and molecules were interspersed throughout the connective tissue. There was no such degeneration in the pons varolii; here, however, was observed the condition already noticed with the capillaries of the cerebellum, an increased amount of amorphous matter mixed with fatty granules, and some amyloid corpuscles. The most remarkable change existed in the spinal cord. This was hardened in alcohol, and different thin sections made, which were put up in glycerine for minute microscopical examination. The cord when fresh exhibited a softened condition of its grey substance. Under the microscope the left anterior and posterior cornua, as well as the parts around the central canal, were considerably destroyed. The structure had here a gelatinous appearance, stretched across by very fine and brilliant fibres of neuroglia mixed with granular amorphous matter, and portions of capillary vessels irregularly distended, and having undergone the granular condition peculiar to epilepsy. Only part of the caput of the posterior cornu had escaped destruction, and as to the anterior cornu it had nearly disappeared. It would have been interesting to ascertain the extent of this degeneration throughout the cord. The grey substance was equally but irregularly involved in the medulla oblongata, and much changed in its structure, particularly at the origin of the hypoglossus.

The main features of the case here described and so rapidly brought to a close, suggest interesting comments.

The complete arrest of the spasms upon the exhibition of large doses of bromide of potassium, and the complete inability of the patient to recover, seem to be not casual coincidences, but facts connected with each other. It was evident, when the girl entered the Institution, that the disease was in active untoward march, the spasms were more frequent, attended with marked impairment in the mental condition of the child and emaciation. No treatment had been opposed to all this mischief, and it would seem as if the bromide of potassium, after controlling the disturbance in the cerebral circulation, arrested the chief source of convulsions, without, however, having an influence over the alterations of the nervous system, already too far advanced to permit a renewal of their exhausted activity. However this may be, the phenomenon is interesting. The most striking point in reference to the case is that of the state of the spinal cord, which brings further evidence against the theory regarding the transmission of sensitive impressions put forward by Brown-Séquard. In this instance the central grey matter, the cornua, and the very extremities of the posterior cornu, were deeply altered, and yet sensibility was increased instead of lost, notwithstanding such an extensive damage to the channel through which it is supposed to be transmitted. In the *British and Foreign Medico-Chirurgical Review* for April, 1864, there is the report of a case of paralysis by I. Russel Reynolds, with pathological investigations by Lockhart Clark. This distinguished anatomist found that the central grey substance of the cord was destroyed on both sides, with painful hyperæsthesia of the left arm, and not the slightest impairment of sensibility of the trunk and lower extremities. From this and other similar cases falling under his observation, Clark has been led to reject the above theory: he does not believe that sensitive impressions are conveyed from the anterior or posterior extremities to the

brain, and that voluntary impulses are transmitted in an opposite direction to the same parts, *exclusively* and *uninterruptedly* by the *grey substance*; but that this substance is the conductor of any given impression only for a certain but variable distance. My own investigations agree in results with those of Lockhart Clark. I have reported, in the *New York Medical Journal* for April, 1865, a case of apoplexy of the spinal cord, in which the grey substance had in many places been injured in its whole width without causing anaesthesia. Since that time I have also met with a very remarkable instance, in which the grey substance of the cord had in many places undergone an extensive fatty degeneration and sclerosis, also involving the white substance, and yet the patient never complained of any loss or other impairment of sensibility. The patient died suddenly whilst straining to relieve his bowels. On post-mortem examination, evidences of cerebral softening, with atheromatous degenerations of the cerebral blood-vessels, were apparent to the naked eye. There was also an aneurismal enlargement of the vertebral arteries, and the dilatation of the right side burst during the effort, producing haemorrhachis and instantaneous death. I preserve a photographic copy of this interesting specimen, showing a clot plugging the vessel and determining its distention—a not unfrequent source of aneurism, first pointed out by Dr. John W. Ogle, and which I have repeatedly found to be the cause of the dilatation of the cerebral and spinal arteries, observed in delirium tremens, softening of the brain and epilepsy.

LAKE MAHOPAC, N. Y., June 1, 1868.

CASES IN ORTHOPEDIC SURGERY.

(With Photographs.)

BY BUCKMINSTER BROWN, M.D.

READ JUNE 3, 1868.

ORTHOPEDIC SURGERY.

MEMBERS of the Profession, both those residing in the city and those coming from a distance, are frequently reminding me that cases showing the results which can now be attained by combined operative and mechanical surgery, in the treatment of deformities, possess a great interest for the general practitioner. Acting upon these suggestions, it is proposed at this time to state, in few words, the history of several cases, most of which have recently come under my observation, and are brought forward as examples of some of the various classes into which this branch of surgery is divided. The better to elucidate the subject, casts or photographs will be shown, before and after treatment; and, in two or three instances, I am enabled to present the patient to the Society for examination.

CASE I. Casts Nos. 1 and 2. Photographs 1 and 2.

TALIPES.—The first case to which I will draw attention is the one from which this cast and this photograph were taken. (See Case I., Plate I., figure 1.) A boy born with such a distortion of the leg and foot that the great toe was turned up against the side of the knee, and, when the child was awake, was in close contact with the internal condyle of the femur. The tibialis anticus and posticus muscles were strongly contracted—structurally shortened. The treatment consisted in the division of the tendons of these muscles, and in the use of a variety of apparatus, employing sometimes the spring

and sometimes the screw power. By these means the leg and foot were gradually brought into a normal position. By the time, however, this result was somewhat more than half accomplished, the tendons, growing more rapidly than the bones, had united, and again presented an obstacle to further improvement. These were re-divided, and, in about six months, the result was as shown in the second cast. (See Case I., Plate I., figure 2.) The second photograph gives a correct idea of the foot when it was nearly straight. When I last saw the child, he walked on the sole of his foot.

CASE II. Casts Nos. 1, 2, 3, 4.

This is a case of paralytic calcaneo-valgus, the result of spina bifida. (See Case II., Plate I., figures 3 and 5.) The patient is a girl eleven years old. It is evident that in the left foot the articular facet of the astragalus, instead of being applied against the internal malleolus, does not enter into the composition of the ankle-joint, but, with its rounded internal face, and with the scaphoid, forms the projection on the inside of the foot. It will be seen that the front part of the foot is higher than the heel, therefore it is calcaneo-valgus; yet, in reality, from the displacement of the calcaneum, the origin and insertion of the gastrocnemius are approximated. Thus is presented the somewhat anomalous state of the parts in which, although treating a case of calcaneus, instead of desiring to shorten the tendo-Achillis, we are obliged to increase its length before the foot can be replaced. The tendons divided in the left foot were the three peronei, the extensor longus-communis, extensor pollicis-pedis, the tibialis anticus and the tendo-Achillis. The same tendons were divided in the right foot, with the exception of the tibialis anticus and the tendo-Achillis. I here present the models of the feet, as they were before treatment, and

four months after the commencement of treatment. (See Case II., Plate I., figures 3, 4, 5, 6.) The child is able to walk on the soles of the feet.

CASE III. Casts 1 and 2. (Patient present.)

There are but few cases in which the patients are so situated as to appear on such an occasion as this. Either they live at too great a distance, or they dislike to be presented. This boy, however, willingly comes forward. He well illustrates the legitimate results of the combination of operative and mechanical surgery. He is nine years of age. He had congenital varus of the right foot. Continued use of the foot had converted it into what has been termed varo-dorsalis. The foot had been operated upon some years previous to coming under my care. I divided the tibialis anticus, plantar fascia and tendo-Achillis. (See Case III., Plate II., figures 1 and 2.)

CASE IV. Cast No. 1, and Patient.

I have here a cast of one foot from a case of double talipes varus. The feet were alike. (The patient will stand upon the table, or walk around, that gentlemen who wish may examine her feet.) (See Case IV., Plate II., figures 3 and 4.)

CASE V. Casts Nos. 1 and 2, and Patient.

This cast (see Case V., Plate II., figure 5) speaks for itself. The child is three and a half years old. She had paralytic varus. The tendo-Achillis, tibialis anticus and posticus, and extensor longus pollicis pedis were rigidly contracted. These tendons were divided in February, 1868. In twenty days after the operation, the paralyzed muscles,

no longer kept fully extended by their contracted antagonists, completely recovered their power, and the child was able to flex and abduct the foot. A cure was effected in two months. (See Case V., Plate II., figure 6.) The child is now under treatment for contracted knee, arising from the same cause. The biceps flexor cruris has been recently divided.

Paralysis is rarely the cause of congenital varus. Non-congenital varus, however, frequently arises from paralysis of a single muscle or of a set of muscles. On the other hand, the etiology of both congenital and non-congenital *valgus* may so constantly be traced to debility of muscles and ligaments—amounting, in the majority of cases, to complete paralysis—as almost to form the rule in this class of cases. The return of power to the paralyzed muscles I have frequently observed after division of the healthy muscles, which are structurally shortened in consequence of the normal balance of power having been destroyed.

CASE VI. Casts Nos. 1 and 2.

Within a year or two, much has been said and written in regard to the cure of talipes without tenotomy. This case may be cited (one among several that could be referred to) as a fair instance of the result of such attempts. (See Case VI., Plate III., figure 1.) The child from whom the cast was taken was born with double talipes varus. A few days after birth the treatment by apparatus was commenced, and was continued two years. For three months the patient was visited daily by the attending surgeon. The result, after two years, was a failure, as is shown in the first cast, taken when he came under my treatment. The second cast was taken three months afterwards. (See Case VI., Plate III., figure 2.)

CASE VII. Casts Nos. 1 and 2.

The cast I have in my hand (see Case VII., Plate III., figure 3), represents a case of varus, interesting from the fact that a somewhat similar attempt to the preceding had been made to cure the foot. It has been said the hand of the mother or nurse is in truth the best apparatus. In this case the mother, instructed by her physician, had devoted herself to the task. She had held the foot in her hands, on the stretch towards a straight line, four hours a day for three months. Flexion was impossible from any force that could be applied to it. That her labor was thrown away is shown in this first cast taken when the patient was brought to Boston. This second cast shows the foot after tenotomy and subsequent treatment. (See Case VII., Plate III., fig. 4.)

CASE VIII. Casts Nos. 1 and 2.

I have cited cases showing the nugatory effects of protracted mechanical treatment without operation. Here are a couple of casts, not remarkable in themselves, but interesting as examples of numerous cases exhibiting the same or worse results from the opposite mode of treatment, viz.:—too much surgery without appropriate after-treatment. The lad, from whom this model was taken, had been operated upon six times by a distinguished New York surgeon. The tendo-Achillis was divided three times. After five years treatment the foot was as malformed as at first. (See Case VIII., Plate III., figure 5.) The second model was taken after the boy had been in Boston three months. (See Case VIII., Plate III., figure 6.)

CASE IX. Casts Nos. 1 and 2.

These casts furnish another instance of the fact just alluded to. The boy had double varus, third degree. He

had been operated upon ten or twelve times; and had likewise been under treatment five years by surgeons in New York and at the West, with the disastrous result seen in the first cast. (See Case IX., Plate IV., figure 1.) The second cast shows the feet (they were alike) when he left Boston. (See Case IX., Plate IV., figure 2.) .

CASES X. and XI. Casts.

In order to make the series more complete, there are on the table, one sample of talipes equinus before and after treatment (See Case X., Plate IV., figures 3 and 4); also casts of a case of varus, treated several years since, introduced simply to show that the growth and strength of the limbs are not diminished by somewhat extensive tenotomy. The case was one of extreme double varus. The tendo-Achillis in each foot was twice divided, also the tibialis posticus and flexor longus pollicis pedis. The boy was treated and cured, when eight years of age. The second cast was taken twelve years afterwards. (See Case II., Plate V., figures 1 and 2.) These years the lad had passed chiefly at sea, doing duty as a sailor. He has since become master of a vessel, and states that he has never experienced the slightest inconvenience from his feet.

CASE XII. Casts Nos. 1 and 2.

This is an example of a case of genu varum or bow-legs. Both legs were similarly affected. It is curious to notice, that, although the legs were tightly strapped on the convex side for months, yet the healthy growth and development were not impeded, as is well shown in the second cast. (See Case XII., Plate V., figures 3 and 4.)

CASE XIII. Photographs Nos. 1 and 2.

This photograph (see Case XIII., Plate VI., figure 1) represents the legs of a little girl as they were when she came under treatment. It was a bad case of genu-valgum of the right leg, and genu-varum of the left. The result, as shown in the accompanying photograph, was attained by apparatus without tenotomy. (See Case XIII., Plate VI., figure 2.)

CASE XIV. Photographs Nos. 1 and 2.

These photographs were taken from another case, of a similar nature to the preceding, before and after treatment. In this case, also, no operation was required. The distortion, in both instances, was caused by malformation of the joints, uncomplicated by muscular contraction.*

LATERAL CURVATURE OF THE SPINE, or, according to the latest and best authority,† "Rotato-Lateral Curvature," in its advanced stages, is one of the most discouraging affections with which we have to deal. Much, however, can be accomplished by patience and perseverance. In spinal curvature, as in most other cases pertaining to this branch of surgery, frequent variation of the treatment, and, where apparatus is employed, a frequent change in the appliances, is required.‡ They should be modified according to the exigencies of the case, adapting the means employed to the

* The photographs of Case XIV. are not copied for publication, as the case resembles that represented on Plate VI.

† On Spinal Weakness and Spinal Curvature; its early Recognition and Treatment. By W. J. Little, M.D. London, 1868.

‡ This rule applies, with especial force, to talipes. In every species of club-foot, excepting where the twist is very slight, from two to six, or even more varieties of apparatus are often required to make a perfect foot.

changes in the form as the cure proceeds. It may be interesting to mention an extreme case of this complaint which has recently come under my observation.

CASE XV.

Miss ——, aged 31. Has had curvature of the spine from childhood. Her body, from neck to hips, has gradually shortened. For this there is a partial compensation in the greatly increased antero-posterior diameter of the chest. On examination, I found the crest of the ilium, on the left side, to be two inches from the axilla. On the right, the distance is two and three-fourths inches. In fact these bones are lodged directly beneath the shoulders. The os pubis is three and one-half inches from the sternum. Relief, by an accurately adjusted support, was the only treatment admissible. Such extraordinary cases are rarely met with.

CASE XVI. Photographs 1 and 2.

Here is a photograph of the back of a boy from Lawrence, Kansas. (See Case XVI., Plate VII., figure 1.) He had severe lateral curvature. The left hip was very prominent. The trunk, above the hips, was thrown so far to the right, that the centre of the occiput was on a line with the right leg; consequently, in standing, the weight of the body was sustained by this leg. The right scapula and ribs projected, and the left scapula sank into the hollow formed by the curve. This unequal distribution of the weight of the body had produced an inward inclination of the left knee. The second photograph (See Case XVI., Plate VII., figure 2) shows the state of the spine some months since. It is now still further improved. The left shoulder, formerly much below the level of the right, is now the higher. This will rectify itself. The knee was cured by proper apparatus.

CARIES OF THE CERVICAL VERTEBRAE, compared with the same affection as it attacks other regions of the spinal column, is a rare disease. Some years since I published an account of a case of caries of the upper bones of the neck, remarkable in many points of view, which terminated fatally. The atlas, axis and base of the cranium were eroded, and death was caused by fracture of the odontoid process. The pathological appearances were minutely described. About the same time two or three similar instances presented themselves, which were also fatal. Since then I have treated other cases of cervical caries which have had a more favorable termination. There are present, to-day, two children who have been sufferers from this disease.

CASE XVII. (Patient.)

This little girl, when I first saw her, eleven months since, had lost all voluntary power below her neck. She could speak in a whisper. The only muscles not paralyzed were those connected with the eyes and mouth. She had been in this state some months. There was swelling and prominence of the lower cervical vertebrae. In February, 1866, an abscess formed in the neck, which continued discharging, at intervals, for twelve months. She then began to lose the use of her right arm and leg. The paralysis extended, involving both arms and legs, with inability to move the head. For a time the bladder was implicated, and the use of a catheter was required. She had paroxysms of severe pain in the lower cervical vertebrae. The child, as you see, is now well and without deformity. There is scarcely a trace of the disease remaining.

I have recently been informed that the elder sister of this patient died of caries of the dorsal vertebrae, after having been paralyzed three years.

CASE XVIII. (Patient.)

This boy had the same disease in about the same situation. The symptoms, also, were very nearly similar, but had been of longer duration when he came under my observation. There was complete paralysis of all the voluntary muscles below the mouth. He had been unable, for months, to move his head, or to bend a finger or a toe, or to speak above a whisper. Severe pain was produced if any attempt was made to bend his fingers, wrists, knees or ankles. The joints were stiff. He had incontinence of urine. The respiratory muscles acted imperfectly, and his breathing was labored. His countenance expressed suffering, and his manner of rolling his eyes, to compensate for inability to move his head, gave him a very singular appearance. The paralysis commenced about ten months previous to his being placed under my care. Power of motion returned first to his fingers, and gradually extended, and in three months he began to walk. The treatment consisted, in the first place, of mechanical support to retain the head in one position. The apparatus was a spring collar, resting on the clavicles and shoulders, with branches running down the back, and secured by a belt. Passive exercise of all the joints was perseveringly employed. Friction, electro-magnetism, the pyro-phosphate of iron, and cod liver oil were important adjuncts. Chloroform was given internally, to relieve pain. In this case it is interesting to notice that the efforts of nature to cure the disease have exceeded the necessity; and there has been a great amount of ossific matter thrown out around the bones, producing considerable deformity of the neck. An abscess formed and opened spontaneously. The boy is now able to walk long distances, carrying bundles and going on errands.

CASE XIX. (Patient.)

HIP DISEASE.—It is impossible, in the brief time to which these papers are necessarily limited, to give more than a very imperfect sketch of the various diseases, and their effects in deranging and distorting the human frame, which receive their proper classification in the branch of surgery we are now considering. The cases already brought forward are of practical importance. Those last introduced, all will acknowledge, are eminently so. They are instructive instances of the recuperative powers of nature, aided and guided by art; and teach us how much these may be relied upon even in cases which appear utterly hopeless. I should be glad, if time permitted, to draw your attention to the several varieties of hip disease, referring to the diverse, and sometimes almost opposite modes of treatment appropriate to the different cases and to the different stages of the same case. The interest attached to these would be increased if the patients, showing in their persons the results, could be presented to you as in some of the preceding cases. My limits permit me, at this time, to bring forward one patient only. He suffered from *morbus coxarius* from August, 1866, to March, 1867. When first seen by me, in October, 1866, he could not bear the slightest touch in the neighborhood of the left hip, and had severe pain in this joint and in the knee. He had frequent startings in the night, waking and screaming with pain. The patient was seen by Dr. J. Mason Warren, and other surgeons, during the early months of the disease. The treatment was directed, in the first place, to relieving the symptoms of acute action within the joint. It has been much the fashion of late, for surgeons treating hip diseases, and those analogous, of the spine, to discard, as old fashioned, all counter-irritants and antiphlogistic remedies. Let me urge them not to do this in every case. There are certain varieties and phases of these diseases in which there

are no other means of relief possible. Mr. Pott was not so utterly mistaken as many in these days would have us believe. There are cases of disease of the hip or spine in which a modification of his treatment is of incalculable benefit, and it is only on account of its indiscriminate employment in all varieties of these complaints, in many of which disappointment has attended its application, that it has fallen into discredit.

In the earlier stages of some species of hip disease, for example, we have too frequently seen the severe pain, the extreme tenderness of the joint, where the slightest jar is agony, the nocturnal startings and spasms, and the pain in the knee removed, after having existed for months, by flying blisters, or by an issue, preceded, if the state and history of the patient render it advisable, by slight local blood-letting, to have a doubt left in our minds in regard to the importance of these remedies. The relief is often immediate; neither extension, nor rest, nor internal remedies will have the slightest effect in such cases, without the aid of local applications in some one or more of the forms which experience has taught us are most beneficial. Quiet nights and comfortable days were the immediate results of this course in the case now under consideration. A hip-splint was applied, complete rest enjoined, and slight extension was used. The apparatus employed had especial reference to the prevention of contraction or permanent displacement at the joint, one of the most frequent and unfortunate sequelæ of this disease, to obviate which requires the exercise of the utmost caution. The boy has been, for more than a year, in as perfect health as you now see him. There is not the slightest limp. That the hips are alike in appearance and perfectly normal in action, will be acknowledged by those who will examine the patient.

The importance of attention to position in hip complaint

cannot be too strongly insisted upon. It may be useful, in this connection, to refer to a case which, probably, has not its counterpart upon record. It was that of a young girl, who was brought to me from a distance, a few years since. She was thirteen years of age, and had suffered, for many months, from double hip disease. She had gone through the several stages of the complaint, and it had terminated in ankylosis. From malposition, during the acute periods, both thighs had become permanently fixed at right angles with the sides of the body, on a line with the axillæ, and parallel with the arms when stretched in such a manner as to afford the fullest expansion to the chest. In sitting, the lower limbs projected over the sides of the chair. The head of each femur was joined to the acetabulum by a solid, bony union. The case was irremediable. A greater misfortune can scarcely be imagined. Double excision at the hip joint was a procedure maturely considered, but decided not to be advisable under the circumstances.

TORTICOLLIS, a less common complaint than any of the preceding, has some curious features which are worthy of notice. Its causes are various. Frequently it arises from contraction, congenital or non-congenital, of one or both branches of the sterno-cleido-mastoideus muscle, sometimes combined with a similar affection of the trapezius or scaleni. Spasm, permanent or intermittent, the cicatrices of burns, and paralysis, may give rise to this affection. Other instances of wry neck originate in rheumatic inflammation of one or all of the muscles just named. I have found the trapezius condensed into a firm, indurated tissue, apparently as unyielding as ligament. I have also seen very serious distortion arise from rheumatism attacking the inter-vertebral substance between two or more of the cervical vertebræ.

This disease will produce swelling and permanent thickening of the ligamentous tissue on one side, the bone, perhaps, being implicated, while the muscles are not at all, or but slightly involved. The peculiar, characteristic, rotatory twist, in these instances, is less observable than in other varieties of torticollis. Those cases originating in the causes first mentioned are generally incurable without division of the offending muscles. The last named may, often, be completely relieved by apparatus and appropriate remedies. An appliance which shall fix the head, and enable us to act upon it steadily and firmly, has been a desideratum in surgery, not only for the treatment of the complaint we are now considering, but, also, when dealing with the deformities arising as a sequence of burns and from other causes. I have seen but one apparatus that does this effectually. It was invented by Dr. John B. Brown, some years since. This instrument answers every indication in torticollis, and, for accomplishing the object desired, is nearly perfect. We have, in this affection, to contend, first, with the sideward inclination of the head, which sometimes almost touches the shoulder; secondly, with the rotation, by which the face is turned towards the opposite shoulder; thirdly, with the tendency to stoop, or posterior curvature of the dorsal vertebrae; and, fourthly, with the lateral curvature, which is the inevitable result of the disturbance of the equilibrium above. The apparatus referred to, consists of a padded steel belt, which firmly grasps the pelvis. From the centre, opposite the sacrum, arises a strong steel upright, terminating in a steel skull-cap, which encircles the head, with a tongue, projecting obliquely downwards and forwards, to press upon the superior and inferior maxillary bones. There is a crutch, on one side, to balance the instrument and to support the depressed shoulder. A broad belt, also of steel, attached to the back

upright, embraces the body below the axillæ, and buckles in front. About two inches below the cap, upon the posterior standard and opposite the cervical vertebræ, is a circular ratchet-wheel which acts in such a way as to rotate the head; below this, another, working in a different direction, tilts the head towards either shoulder. A third ratchet-wheel, opposite the middle dorsal vertebræ, acts antero-posteriorly, and corrects the stoop which is a frequent accompaniment of torticollis. A fourth is placed near the insertion of the standard to the pelvic belt. This turns from side to side, and, by means of the upper belt, below the shoulders, unbends the lateral curve of the spine, which, as has been stated above, is always present in a confirmed case of wry neck.

For the milder varieties of this affection, where less power is required, I have contrived a less complicated but very efficient instrument. This is a double spring stock to sustain the head, from which two pieces of steel, about a foot long and half an inch wide, extend down each side of the spine and are secured to the waist by a leather belt. There is a check for the chin, and a spring against the occiput, by which the head is turned and retained in a position the reverse of that towards which it is abnormally inclined.

Another of the sequelæ of torticollis is the series of remarkable twists which gradually occur in the facial lineaments. The physiognomy becomes characteristic. The eyes, nose, mouth, and even the eye-brows, endeavor to adapt themselves to the one-sided position of the head. There is a persistent, involuntary effort made, by the muscles, to compensate for this obliquity and to restore the normal, relative position of the features. This, in time, produces a very peculiar appearance of the countenance, which is pathognomonic of the complaint.

CASE XX. Photographs Nos. 1 and 2.

The last case, of which I have to speak this morning, is that of a girl twenty years of age, whose situation before treatment is shown in this photograph. (See Case XX., Plate VIII., figure 1.) When eleven years old, while at play, she was thrown from a height of sixteen feet, by the caving in of an embankment, the lumbar and sacral spine striking upon a large stone. The fall produced insensibility for a few moments. She then recovered and went to school. She continued her usual avocations for five or six weeks, growing, daily, more and more feeble. She was then attacked with agonizing pain in the lumbar region, followed by complete loss of sensation and motion below the hips. The thighs and legs gradually contracted, until the left knee was forced against, and under, the right thigh, and the thigh was drawn up to an acute angle with the body, and twisted to the right. These parts were in such close contact that it was with difficulty I forced the knee from under the thigh where it had lain for years. The patient had extreme lateral curvature, with excessive incurvation of the lumbar vertebræ. She had been in this situation nine years. By means of subcutaneous division of tendons in the groins, popliteal regions and in the feet, followed by mechanical appliances, together with a carefully adjusted spinal support, the girl was in three months straightened out as seen in the second photograph. (See Case XX., Plate VIII., figure 2.)

There are other photographs and models upon the table, for examination, by any gentlemen who may feel interested.

PLATES.

THE figures in the accompanying Plates are photographic representations of most of the cases described in the preceding paper. They are copied with an accuracy only attainable by that wonderful art which permits the subject to stamp its own image.

Each one is the type of a class, or is illustrative of practical facts referred to in the text, and is indicated by numerals under the appropriate heads.

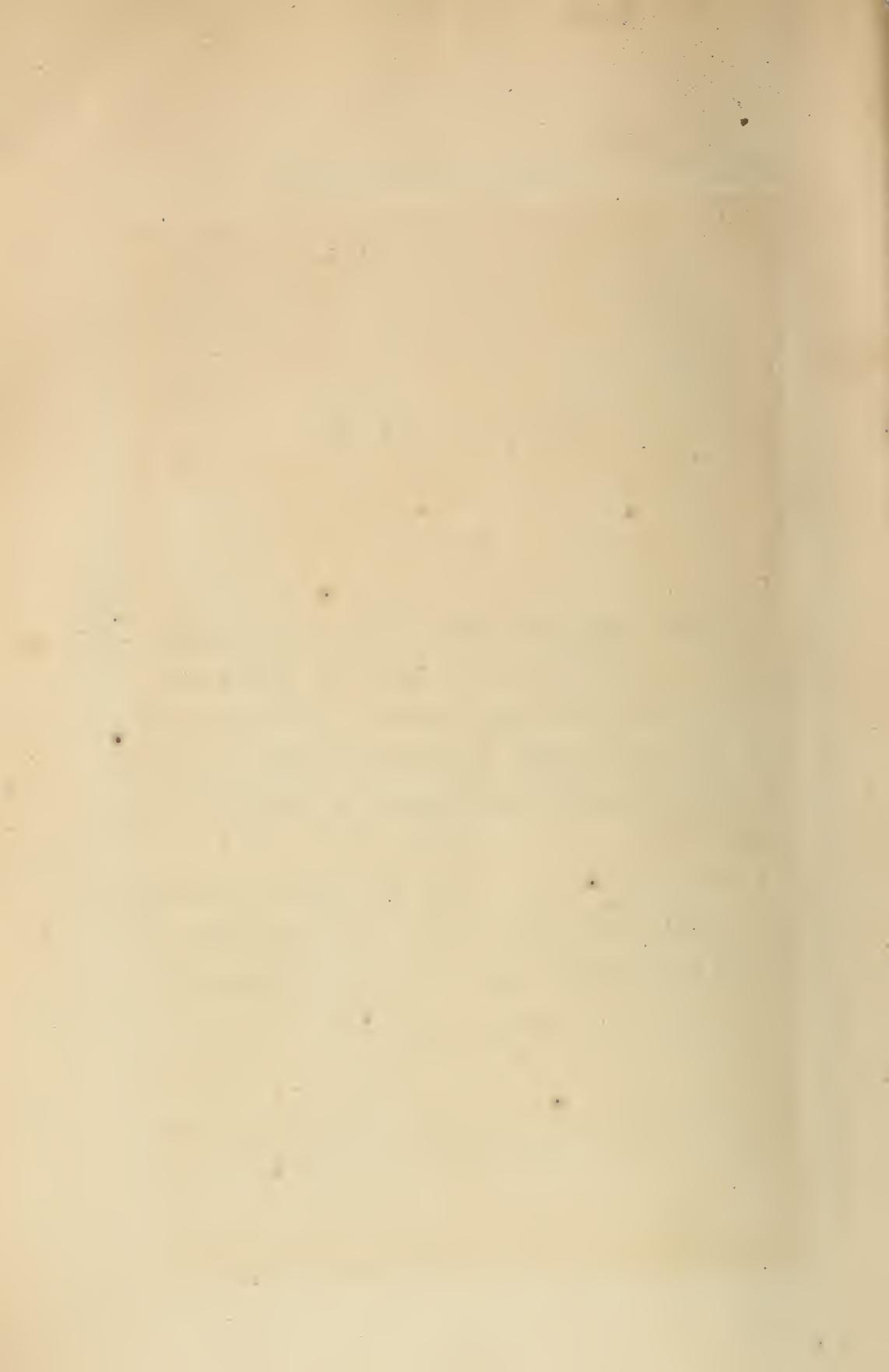


PLATE I.



J. J. HAWES,

PHOTO.

CASE I.

Fig. 1. Before treatment. Fig. 2. After treatment.

CASE II.

Fig. 3. Left foot before treatment. Fig. 5. Right foot before treatment.
Fig. 4. Left foot after treatment. Fig. 6. Right foot after treatment.

PLATE II.



PHOTO.

J. V. HAWES,

CASE III.

Fig. 1. Before treatment. Fig. 2. After treatment.

CASE IV.

Fig. 3. Before treatment. Fig. 4. After treatment.

CASE V.

Fig. 5. Before treatment. Fig. 6. After treatment.

PLATE III



CASE VI.

Fig. 1. Before treatment. Fig. 2. After treatment.

CASE VII.

Fig. 3. Before treatment. Fig. 4. After treatment.

CASE VIII.

Fig. 5. Before treatment. Fig. 6. After treatment.

PLATE IV



CASE IX.

Fig. 1. Before treatment. Fig. 2. After treatment.

CASE X.

Fig. 3. Before treatment. Fig. 4. After treatment.

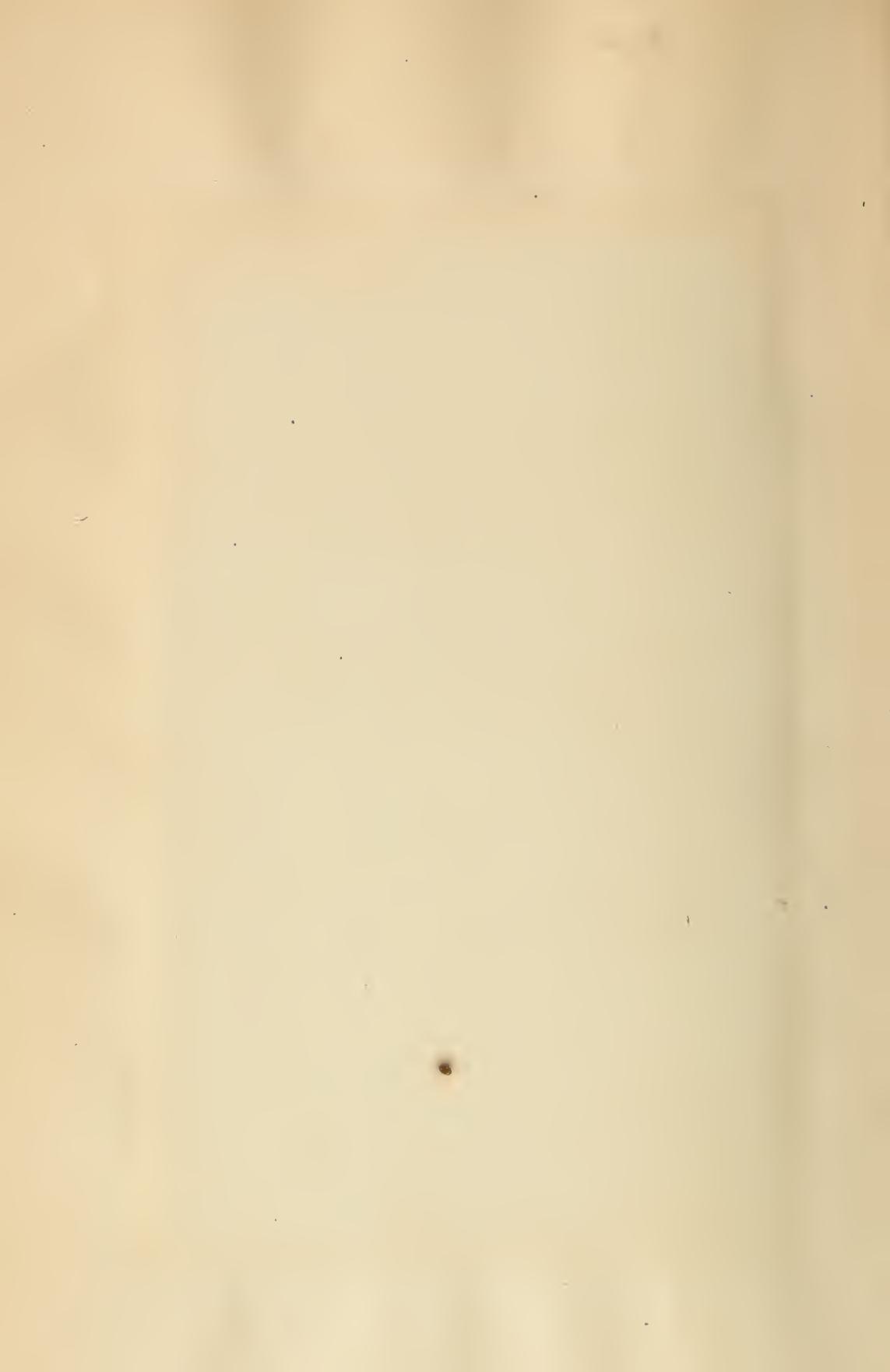


PLATE V.



CASE XI.

Fig. 1. Before treatment. Fig. 2. Twelve years after treatment.

CASE XII.

Fig. 3. Before treatment. Fig. 4. After treatment.

PLATE VI.



CASE XIII.

Fig. 1. Genu-valgum of right leg, before treatment.
Genu-varum of left leg " "

Fig. 2. After treatment.

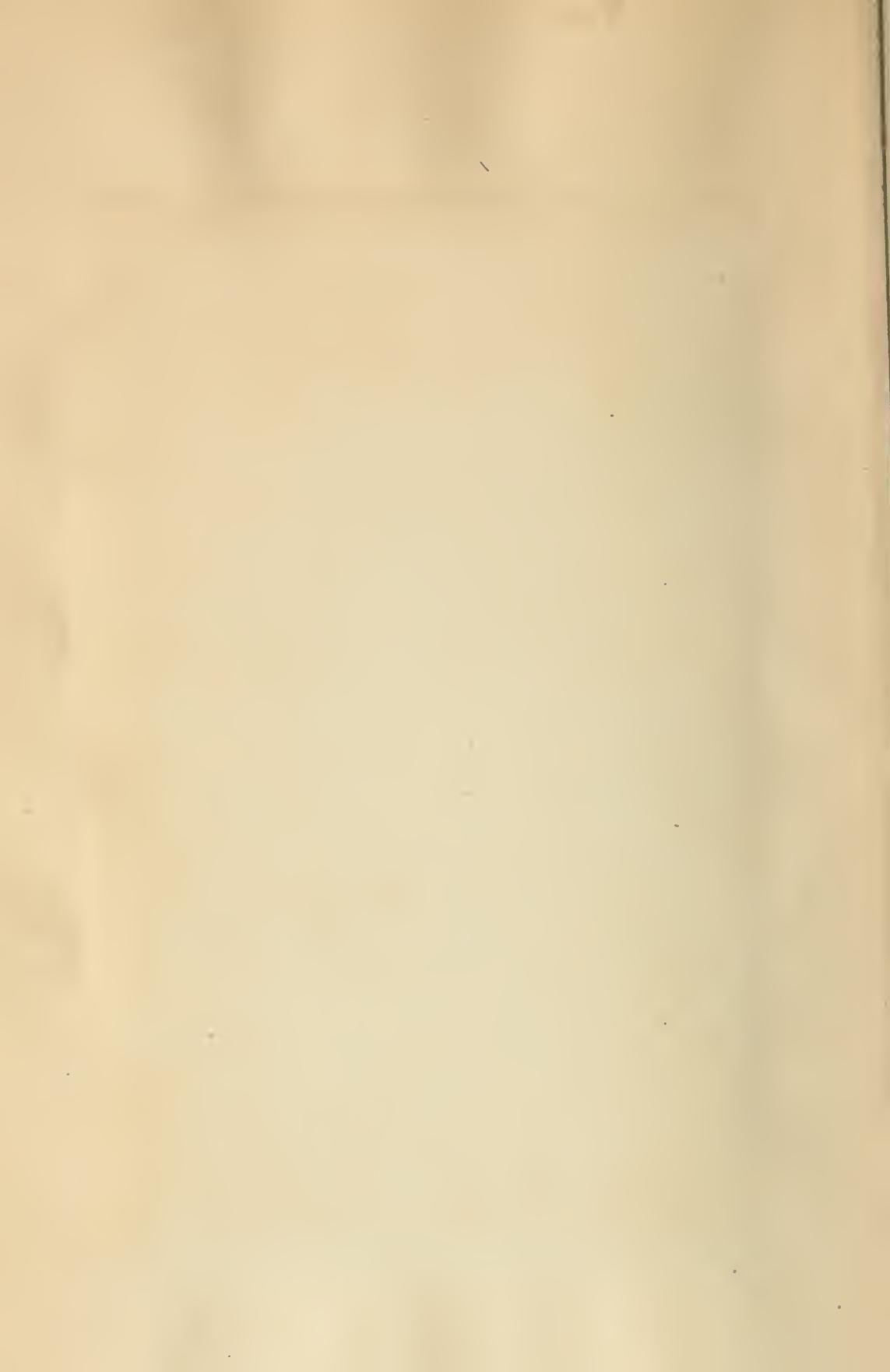


PLATE VII.



CASE XVI.

Lateral Curvature. Fig. 1. Before treatment. Fig. 2. After treatment.

PLATE VIII.

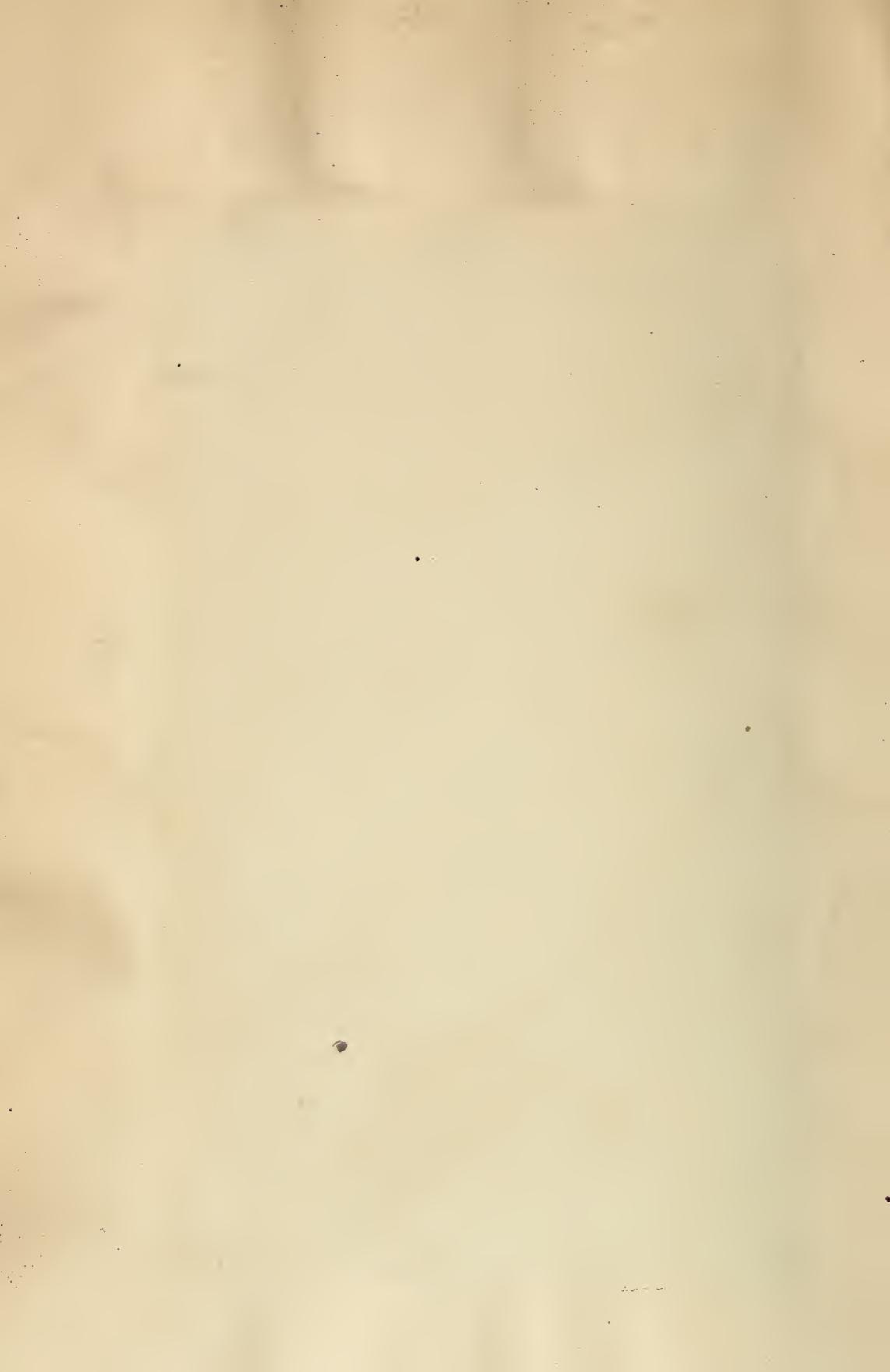


CASE XX.

DISTORTION OF THE SPINE AND LIMBS.

Fig. 1. Before treatment. Fig. 2. After treatment.

PHOTO



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